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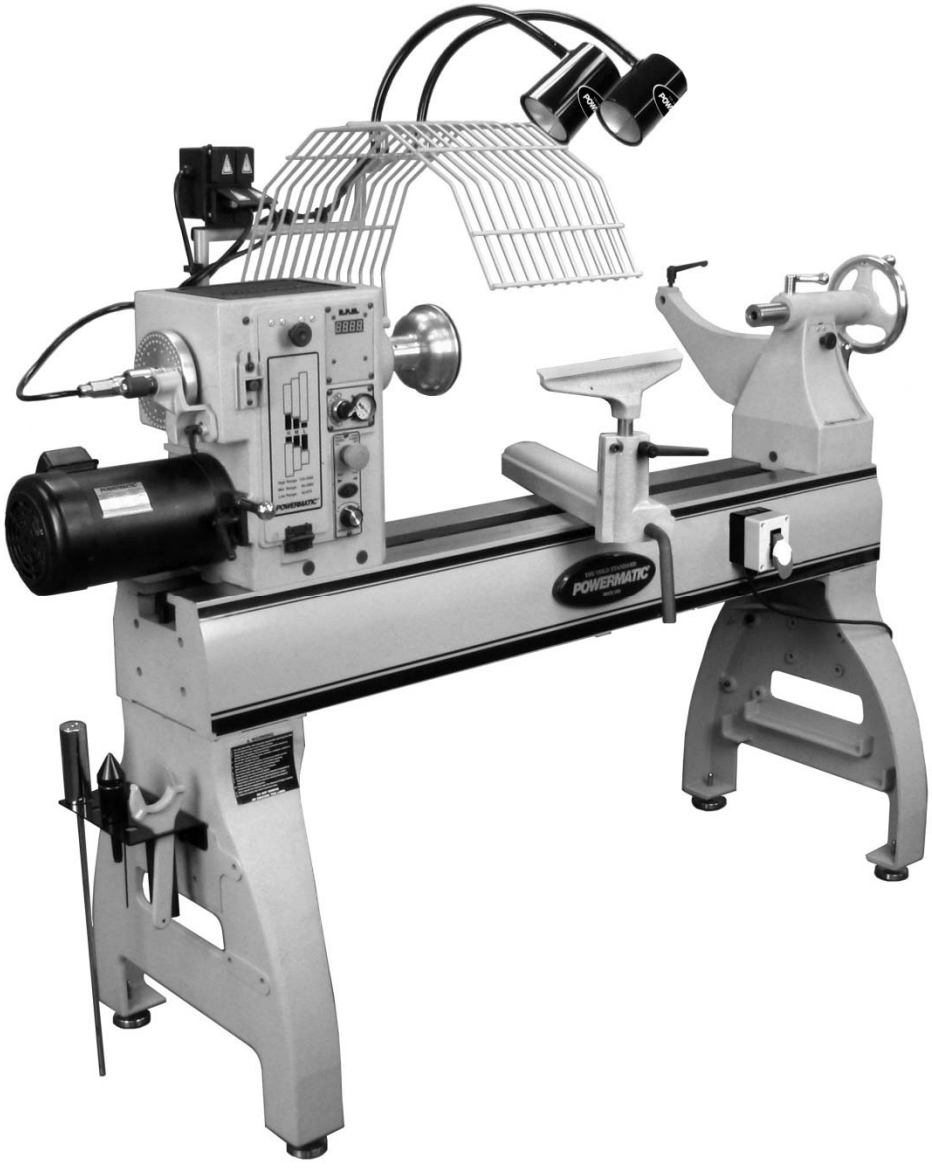
POWERMATIC®

# Operating Instructions and Parts Manual

# 42″ x 24″ Woodturning Lathe

**Model 4224B**

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**Part No. M-1794224B**
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# 1.0 **Warranty and Service**

Powermatic warrants every product it sells against manufacturers' defects. If one of our tools needs service or repair, please contact Technical Service by calling 1-800-274-6846, 8AM to 5PM CST, Monday through Friday.

**Warranty Period**
The general warranty lasts for the time period specified in the literature included with your product or on the official Powermatic branded website.

- Powermatic products carry a limited warranty which varies in duration based upon the product. (See chart below)
- Accessories carry a limited warranty of one year from the date of receipt.
- Consumable items are defined as expendable parts or accessories expected to become inoperable within a reasonable amount of use and are covered by a 90 day limited warranty against manufacturer's defects.

**Who is Covered**
This warranty covers only the initial purchaser of the product from the date of delivery.

**What is Covered**
This warranty covers any defects in workmanship or materials subject to the limitations stated below. This warranty does not cover failures due directly or indirectly to misuse, abuse, negligence or accidents, normal wear-and-tear, improper repair, alterations or lack of maintenance.

**Warranty Limitations**
Woodworking products with a Five Year Warranty that are used for commercial or industrial purposes default to a Two Year Warranty. Please contact Technical Service at 1-800-274-6846 for further clarification.

**How to Get Technical Support**
Please contact Technical Service by calling 1-800-274-6846. **Please note that you will be asked to provide proof of initial purchase when calling.** If a product requires further inspection, the Technical Service representative will explain and assist with any additional action needed. Powermatic has Authorized Service Centers located throughout the United States. For the name of an Authorized Service Center in your area call 1-800-274-6846 or use the Service Center Locator on the Powermatic website.

**More Information**
Powermatic is constantly adding new products. For complete, up-to-date product information, check with your local distributor or visit the Powermatic website.

**How State Law Applies**
This warranty gives you specific legal rights, subject to applicable state law.

**Limitations on This Warranty**
POWERMATIC LIMITS ALL IMPLIED WARRANTIES TO THE PERIOD OF THE LIMITED WARRANTY FOR EACH PRODUCT. EXCEPT AS STATED HEREIN, ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXCLUDED. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

POWERMATIC SHALL IN NO EVENT BE LIABLE FOR DEATH, INJURIES TO PERSONS OR PROPERTY, OR FOR INCIDENTAL, CONTINGENT, SPECIAL, OR CONSEQUENTIAL DAMAGES ARISING FROM THE USE OF OUR PRODUCTS. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

Powermatic sells through distributors only. The specifications listed in Powermatic printed materials and on the official Powermatic website are given as general information and are not binding. Powermatic reserves the right to effect at any time, without prior notice, those alterations to parts, fittings, and accessory equipment which they may deem necessary for any reason whatsoever.

**Product Listing with Warranty Period**

| |
|---|
| 90 Days – Parts; Consumable items |
| 1 Year – Motors, Machine Accessories |
| 2 Year – Woodworking Machinery used for industrial or commercial purposes |
| 5 Year – Woodworking Machinery |

NOTE: Powermatic is a division of JPW Industries, Inc. References in this document to Powermatic also apply to JPW Industries, Inc., or any of its successors in interest to the Powermatic brand.

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# 3.0 **Safety warnings**

1. Read and understand entire owner's manual before attempting assembly or operation.
2. Read and understand the warnings posted on the machine and in this manual. Failure to comply with all of these warnings may cause serious injury.
3. Replace warning labels if they become obscured or removed.
4. This lathe is designed and intended for use by properly trained and experienced personnel only. If you are not familiar with the proper and safe operation of a lathe, do not use until proper training and knowledge have been obtained.
5. Do not use this lathe for other than its intended use. If used for other purposes, Powermatic disclaims any real or implied warranty and holds itself harmless from any injury that may result from that use.
6. Always wear approved safety glasses or face shields while using this lathe. Everyday eyeglasses only have impact resistant lenses; they are not safety glasses.
7. Before operating this lathe, remove tie, rings, watches and other jewelry, and roll sleeves up past the elbows. Remove all loose clothing and confine long hair. Non-slip footwear or anti-skid floor strips are recommended. Do not wear gloves.
8. Wear ear protectors (plugs or muffs) during extended periods of operation.
9. Some dust created by power sanding, sawing, grinding, drilling and other construction activities contain chemicals known to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:
    - Lead from lead based paint.
    - Crystalline silica from bricks, cement and other masonry products.
    - Arsenic and chromium from chemically treated lumber.

    Your risk of exposure varies, depending on how often you do this type of work. To reduce your exposure to these chemicals, work in a well-ventilated area and work with approved safety equipment, such as face or dust masks that are specifically designed to filter out microscopic particles.
10. Do not operate this machine while tired or under the influence of drugs, alcohol or any medication which may impair your judgment.
11. Make certain switch is in OFF position before connecting machine to power supply.
12. Make certain machine is properly grounded.
13. Make all machine adjustments or maintenance with machine unplugged from power source.
14. Remove adjusting keys and wrenches. Form a habit of checking to see that keys and adjusting wrenches are removed from the machine before turning it on.
15. Keep safety guards in place at all times when machine is in use. If removed for maintenance purposes, use extreme caution and replace the guards immediately after completion of maintenance.
16. Check damaged parts. Before further use of the machine, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced.
17. Provide for adequate space surrounding work area and non-glare, overhead lighting.
18. Keep floor around machine clean and free of scrap material, oil and grease.
19. Keep visitors a safe distance from the work area. Keep children away.
20. Make your workshop child proof with padlocks, master switches or by removing starter keys.
21. Give your work undivided attention. Looking around, carrying on a conversation and “horse-play” are careless acts that can result in serious injury.
22. Maintain a balanced stance at all times so that you do not fall against the spindle, workpiece or other moving parts. Do not overreach or use excessive force to perform any machine operation.
23. Use the right tool at the correct speed and feed rate. Do not force a tool or attachment to do a job for which it was not designed. The right tool will do the job better and more safely.
24. Use recommended accessories; improper accessories may be hazardous.
25. Keep turning tools sharp and clean for the best and safest performance, and position tools properly in relation to the workpiece.

26. Turn off the machine before cleaning. Use a brush or compressed air to remove chips or debris — do not use your hands.
27. Do not stand on the machine. Serious injury could occur if the machine tips over.
28. Never leave the lathe running unattended. Turn the power off and do not leave the machine until spindle stops completely.
29. Remove loose items and unnecessary work pieces from the area before starting the machine.
30. Don't use in dangerous environment. Don't use power tools in damp or wet locations, or in the presence of flammable liquids or gases.
31. Check workpiece carefully for splits, knots or other obstructions which may cause a safety risk while turning.
32. Adjust tool support to proper height and position for the work. Rotate workpiece by hand to check clearance with tool support.
33. Make sure all locking handles are tight to prevent creeping of headstock, tailstock or tool post.
34. Turn off lathe before adjusting tool rest.
35. Select appropriate speed for the turning job at hand. Start at low speed and allow lathe to ramp up to operating speed.
36. Never stop a rotating workpiece with your hand.
37. If reversing spindle rotation, make sure face plate or vacuum chuck is secured with the set screws.
38. If gluing up a workpiece, always use high-quality glue of the type necessary for that particular workpiece.

Familiarize yourself with the following safety notices used in this manual:

**⚠CAUTION** This means that if precautions are not heeded, it may result in minor injury and/or possible machine damage.

**⚠WARNING** This means that if precautions are not heeded, it may result in serious injury or possibly even death.

# 4.0 About this manual

This manual is provided by Powermatic covering the safe operation and maintenance procedures for a Powermatic Model 4224B Woodturning Lathe. This manual contains instructions on installation, safety precautions, general operating procedures, maintenance instructions and parts breakdown. Your machine has been designed and constructed to provide years of trouble-free operation if used in accordance with the instructions as set forth in this document.

This manual is not intended to be an exhaustive guide to lathe operational methods, use of after-market accessories, choice of stock, and such. Additional knowledge may be obtained from experienced users or trade articles. Whatever accepted methods are used, always make personal safety a priority.

If there are questions or comments, please contact your local supplier or Powermatic. Powermatic can also be reached at our web site: www.powermatic.com.

Retain this manual for future reference. If the machine transfers ownership, the manual should accompany it.

**⚠WARNING** Read and understand the entire contents of this manual before attempting assembly or operation. Failure to comply may cause serious injury.

# 5.0 **Features**

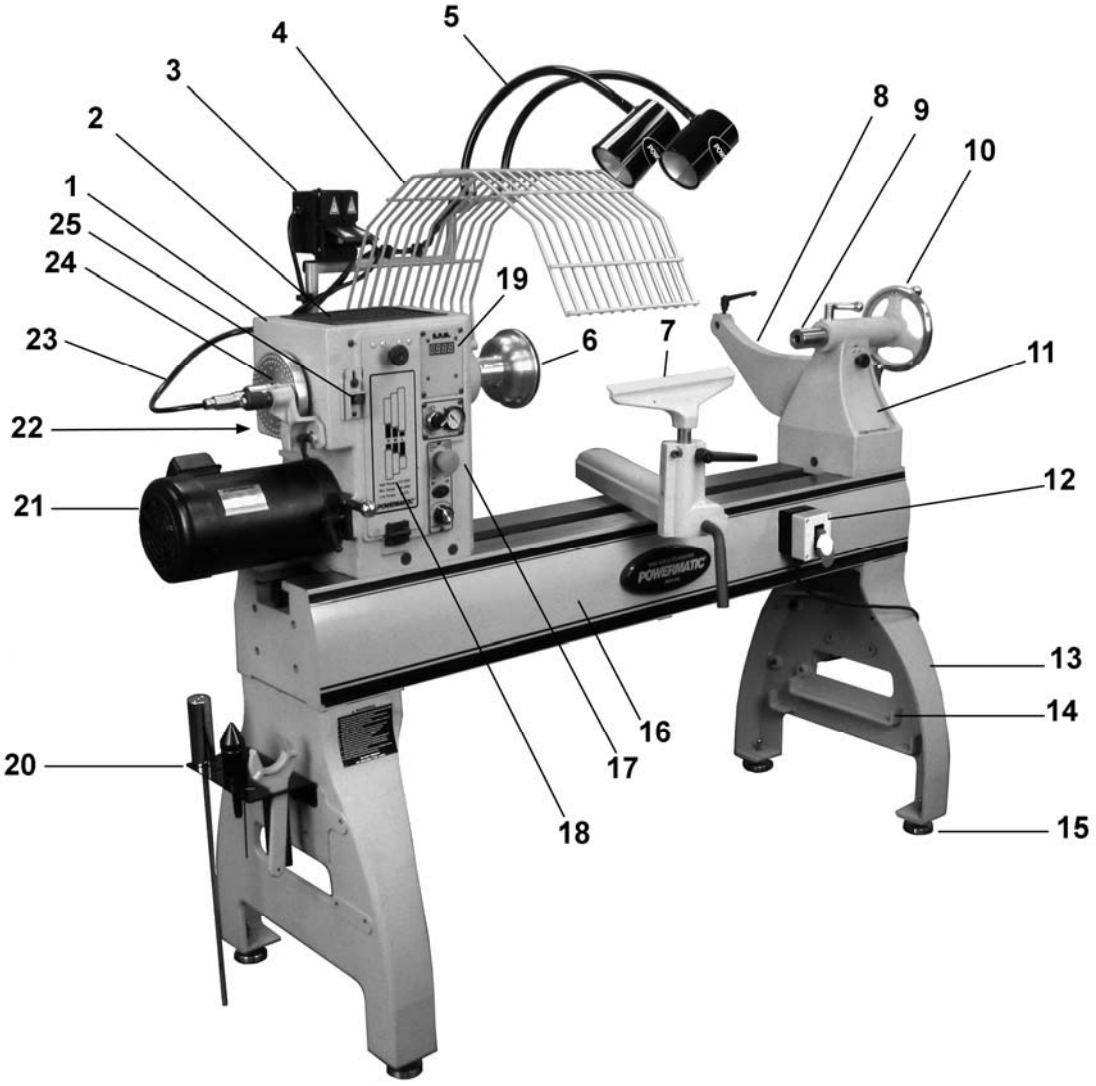



*Figure 1*

1. Sliding headstock
2. Rubber tool mat
3. Quad receptacle
4. Guard
5. Gooseneck lamps (bulbs not included)
6. Vacuum chuck
7. Adjustable 14-inch tool rest with bevel
8. Comparator bracket
9. Tailstock quill with laser-etched scale
10. Tailstock handwheel
11. Tailstock storage cavity
12. Magnetic-backed remote switch
13. Heavy cast iron legs
14. Ledges for shelf support
15. Leveling feet
16. Sturdy cast iron bed with precision ways
17. Front-mounted controls
18. Belt access door
19. Digital readout
20. Tool caddy with accessories
21. 3 Horsepower motor
22. Variable frequency drive (inverter)
23. Air vacuum connection
24. 98-position indexing system
25. Spindle lock

# 6.0 **Specifications**

Model number ..... 4224B
Stock number ..... 1794224K

Motor and electricals:

- Motor type ..... totally enclosed fan cooled, induction
- Horsepower ..... 3 HP (2.2 kW)
- Phase ..... 3 PH
- Voltage ..... 220V
- Cycle ..... 60Hz
- Listed FLA (full load amps) ..... 10 A
- Starting amps ..... 6 A
- Running amps (no load) ..... 3 A
- Power transfer ..... poly V-belt, inverter drive
- On/off switch ..... mushroom style push button
- Motor speed ..... 1720 RPM
- Variable frequency drive (inverter) ..... 2.2kW, 230V, 1 or 3 PH
- Power cord ..... 3/C 14AWG (300V)
- Power cord length ..... 6 ft. (183cm)
- Power plug installed ..... no
- Power requirements ..... 220V, 3PH or 1PH
- Recommended circuit size[1] ..... 20A
- Noise emission, without load ..... 78 dB at 20 inches from motor
- Task lamp wattage, maximum ..... 100
- Quad receptacles ..... 10A, 115V

[1] *subject to local/national electrical codes.*

Capacities:

- Working distance between centers ..... 42” (1067mm)
- Working distance between centers, optional 20” bed ext. mounted ..... 62” (1575mm)
- Working distance between centers, optional 63” bed ext. mounted ..... 105” (2667mm)
- Maximum distance between spindle face and tailstock quill ..... 46-1/2” (1181mm)
- Swing over bed ..... 24” (609mm)
- Swing over tool rest base ..... 19-1/4” (490mm)
- Outboard turning diameter, maximum ..... 88” (2235mm)
- Number of indexing positions ..... 98
- Swing over 20” bed extension in low position *(optional accessory)* ..... 47-1/2” (1207mm)

Headstock and Spindle:

- Spindle taper ..... #2 Morse
- Spindle thread size ..... 1-1/4 x 8 TPI
- Spindle speed (RPM) ..... variable; High: 135-3500; Medium: 80-2000; Low: 40-970
- Outboard external threads ..... M35 x 1.5UNF
- Headstock spindle bore ..... 5/8” (15.9mm)
- Spindle direction ..... forward/reverse
- Vacuum chuck diameter ..... 5-3/4” (146mm)
- Chuck vacuum pressure ..... 21 in/HG (53 cmHG)
- Air hoses ..... 8mm O.D., 120psi
- Air supply required ..... 90 psi (2-3 cfm)
- Air supply coupler ..... 1/4"NPT

Tailstock:

- Tailstock quill taper ..... #2 Morse
- Tailstock bore ..... 3/8” (9.5mm)
- Tailstock quill travel ..... 4-1/2” (114mm)

Materials:

- Legs ..... cast iron
- Bed ..... cast iron
- Headstock ..... cast iron
- Tailstock ..... cast iron
- Headstock spindle ..... hardened HRC50 on nose of thread, steel
- Tailstock quill ..... hardened HRC20 steel, with laser etched scale

Dimensions:

| | |
|---|---|
| Leg footprint | 63”L x 24”W (1600 x 610 mm) |
| Bed length | 63” (1600 mm) |
| Tool support post diameter | 1” (25.4 mm) |
| Overall height, floor to top of headstock, without levelers | 49-1/2” (1257 mm) |
| Distance floor to spindle centerline (adjustable) | 44” |
| Overall dimensions, shipping | 68”L x 27”W x 31.5”H (1727 x 686 x 800 mm) |
| Overall dimensions, assembled | 89”L x 28”W x 65”H (2260 x 710 x 1651 mm) |

Weights:

| | |
|---|---|
| Shipping | 945 lb (430 kg) |
| Net | 870 lb (395 kg) |

The specifications in this manual were current at time of publication, but because of our policy of continuous improvement, Powermatic reserves the right to change specifications at any time and without prior notice, without incurring obligations.

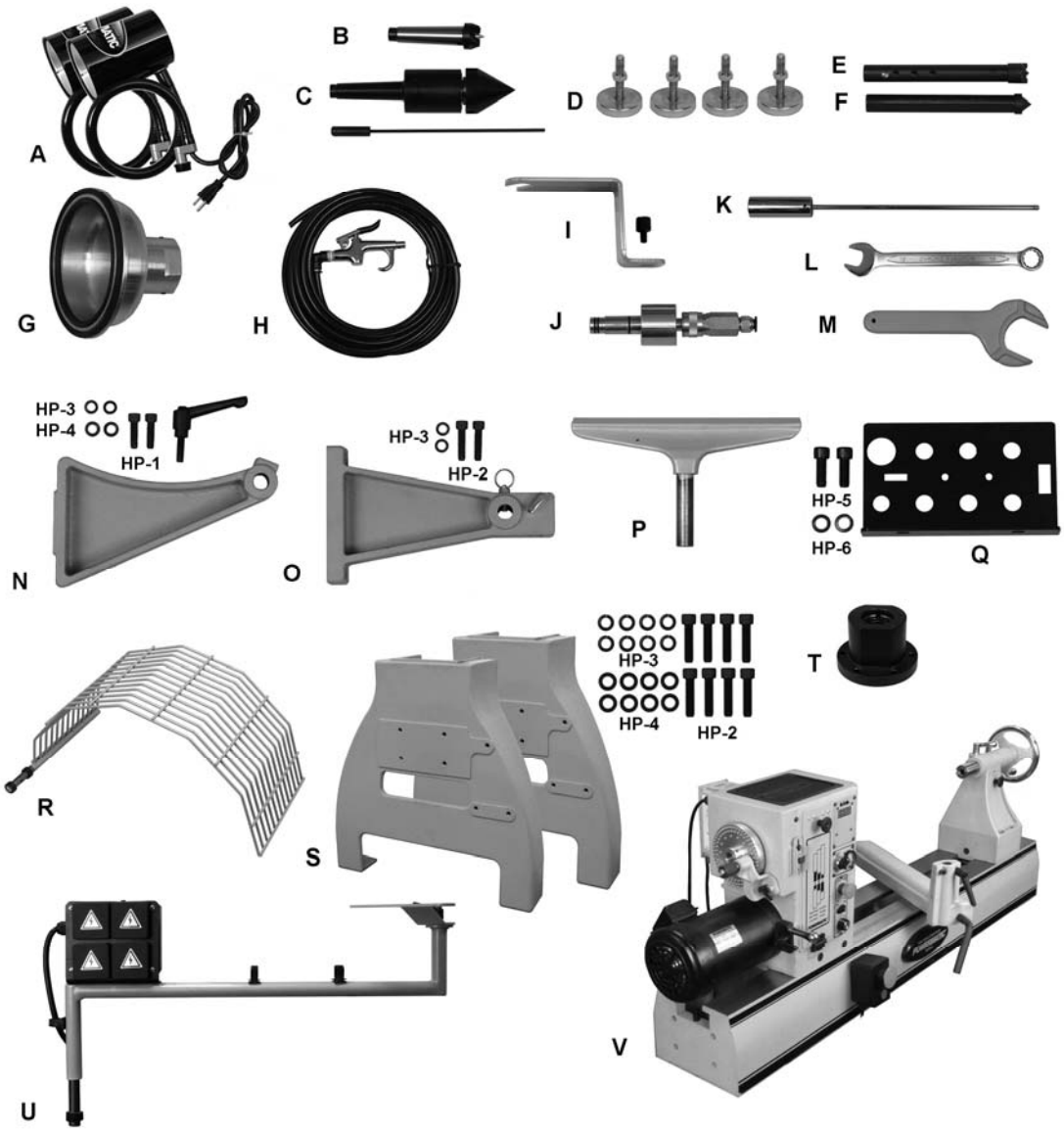



*Figure 2*
*(items not to scale)*

# 7.0 **Setup and assembly**

## 7.1 **Shipping contents**

(See Figure 2)

| | | Qty. |
|---|---|---|
| **A** | Lamps | 2 |
| **B** | Spur center | 1 |
| **C** | Live center with pin | 1 |
| **D** | Leveling foot | 4 |
| **E** | Comparator spur center | 1 |
| **F** | Comparator dead center | 1 |
| **G** | Vacuum chuck | 1 |
| **H** | Air blow gun with hose | 1 |
| **I** | Vacuum adaptor support bracket | 1 |
| **J** | Vacuum adaptor | 1 |
| **K** | Knock-out rod | 1 |
| **L** | Combination wrench, 19mm | 1 |
| **M** | Face plate wrench | 1 |
| **N** | Comparator bracket | 1 |
| **O** | Guard bracket | 1 |
| **P** | 14” Tool rest | 1 |
| **Q** | Tool caddy | 1 |
| **R** | Guard | 1 |
| **S** | Legs | 2 |
| **T** | Face Plate | 1 |
| **U** | Lamp holder set | 1 |
| **V** | Lathe bed with Headstock/Tailstock/ Toolrest Base/Remote switch | 1 |

**Hardware Package** (p/n 4224B-HP):

| | | |
|---|---|---|
| **HP-1** | Socket head cap screw, 3/8x1-1/4 | 2 |
| **HP-2** | Socket head cap screw 3/8x1-1/2 | 10 |
| **HP-3** | Lock washer 3/8 | 12 |
| **HP-4** | Flat washer 3/8 | 10 |
| **HP-5** | Socket head cap screw 1/2x1 | 2 |
| **HP-6** | Lock washer 1/2 | 2 |

## 7.2 **Tools required for assembly**

*provided:*

19mm combination wrench (for headstock)

*not provided:*

4mm hex key (for collars, lamps)

8mm hex key (for legs, brackets)

10mm hex key (for tool caddy)

14mm open-end or socket wrench (for lamps)

Other tools may be required, depending upon any optional accessories you purchased.

## 7.3 **Unpacking and cleanup**

1. Remove all smaller items from main carton. Do not discard carton or packing material until lathe is assembled and running satisfactorily.
2. Inspect contents for shipping damage; if any found, report it to your distributor.
3. Compare contents of shipping carton with the contents list in this manual. Report shortages, if any, to your distributor. Note: Check lathe first – some parts may have been pre-installed.

## 7.4 **Installing legs**

See Figures 3 through 6.

1. Loosen both headstock cams (A, Figure 3) with provided wrench.
2. Unscrew stop bolts (B, Figure 3) from each end of bed.

*Figure 3*

3. Slide off headstock, tailstock and toolrest base (Figure 4).

**⚠CAUTION The headstock weighs 187 lb. Get assistance to help remove. Failure to comply may result in personal injury and/or damage to headstock.**

*Figure 4*

4. Carefully turn bed upside down on skid (make sure nothing is beneath that would scratch the bed ways). Turn it opposite direction from Powermatic logo plate to prevent damage to plate.
5. Install legs (Figure 5), with eight screws, lock washers and flat washers (HP-2/3/4). Warning label must face toward front of bed.

   **NOTE:** If you will be installing the *#6294900, 20" Bed Extension Kit* (optional accessory), now is the optimal time to verify that right leg and bed end surfaces are flush. See Figure 16 and accompanying text for details.
6. Tighten screws firmly.

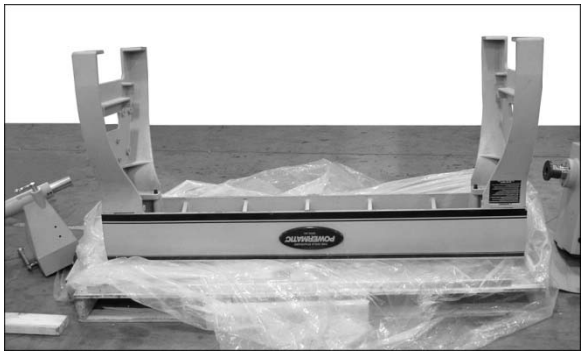


*Figure 5*

7. Install leveling feet (Figure 6), and tighten each nut against the leg. (These can be adjusted later.)

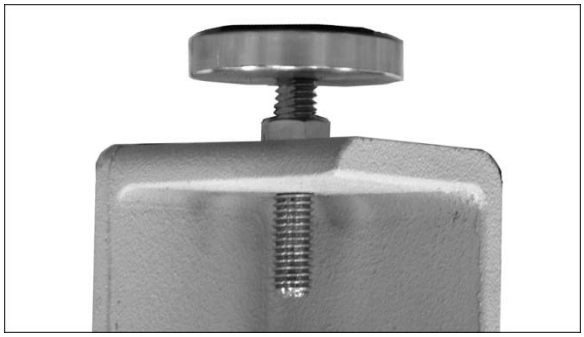


*Figure 6*

**NOTE:** If you are bolting lathe to floor instead of using the leveling feet, AND you will be installing the #6294900, 20" Bed Extension Kit (optional accessory), you will need to shim or block up the legs (minimum 1-1/2" recommended) to raise bed enough to allow sufficient clearance for elevating post.

8. With assistance, raise bed and leg assembly right-side up.

**⚠CAUTION Bed and leg assembly is heavy. Use care when lifting.**

9. Rotate the leveling feet as needed to establish level for the lathe.

10. Install headstock, toolrest base and tailstock, and both stop bolts (B, Figure 3).

## 7.5 Tool caddy

Install tool caddy (Figure 7) to either end of lathe with two screws and washers (HP-5/6). The left end, near the headstock, is generally preferred. The tool caddy has holes for placing knockout rod, centers, faceplate wrench, air adaptors, etc. Accessories can also be stored in the tailstock cavity.

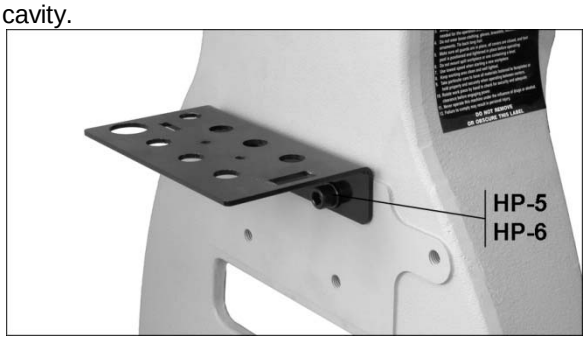



*Figure 7*

## 7.6 Brackets

1. Install guard bracket (C, Figure 8) with two screws and lock washers (HP-2/3).

2. Install comparator bracket (D, Figure 8) to tailstock with fasteners (HP-1/3/4). The bracket holes are slotted for alignment with guard bracket.

3. Install locking handle (E, Figure 8).

See *section 9.11*, *"Comparator"* for further information.

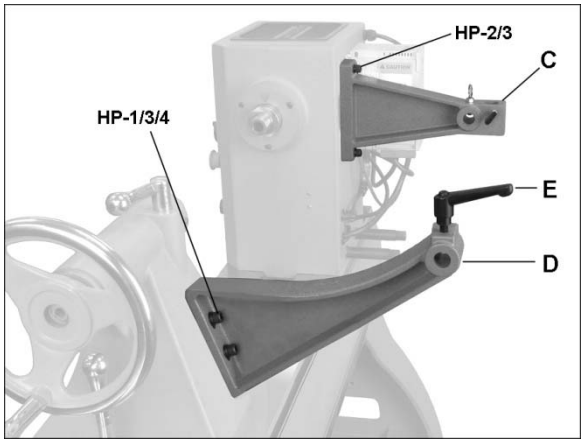



*Figure 8*

## 7.7 Lamp holder set

1. Install shaft of lamp holder (F, Figure 9) into guard bracket hole, and tighten handle (G).

2. Install collar (H) beneath and tighten set screw on collar.

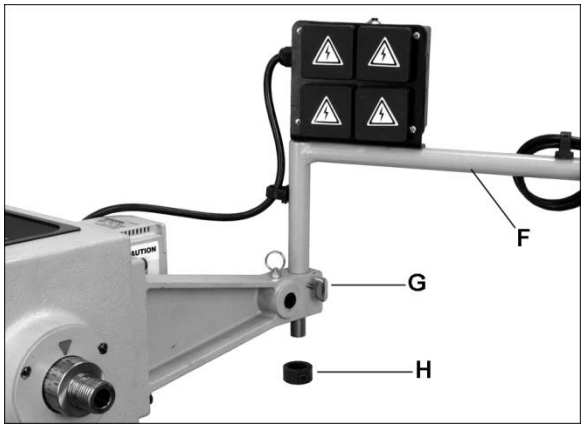



*Figure 9*

To install lamps:

3. Insert stud (J, Figure 10) into plate and secure with lock washer and nut (K/L).

4. Lift up collar (M) on lamp arm while pushing arm down completely onto stud. Push collar back down to secure.

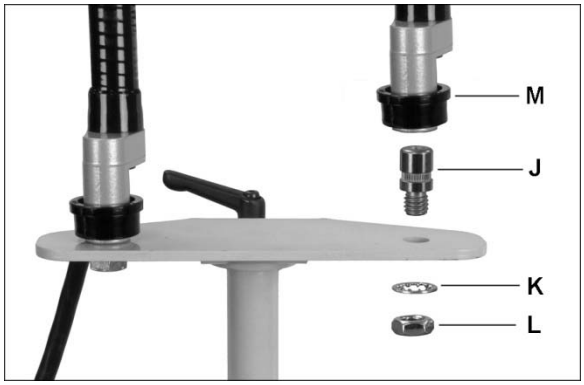



*Figure 10*

## 7.8 Guard

**⚠WARNING The guard must always be used in operations that will allow its use.**

See Figure 11.

1. Loosen set screw of outer collar (N) and remove collar.

2. Insert guard support rod into guard bracket while lifting up on plunger (O). Release plunger and it will snap into position as you slide support rod farther in.

3. Reinstall collar (N) on end of guard support rod and tighten set screw.

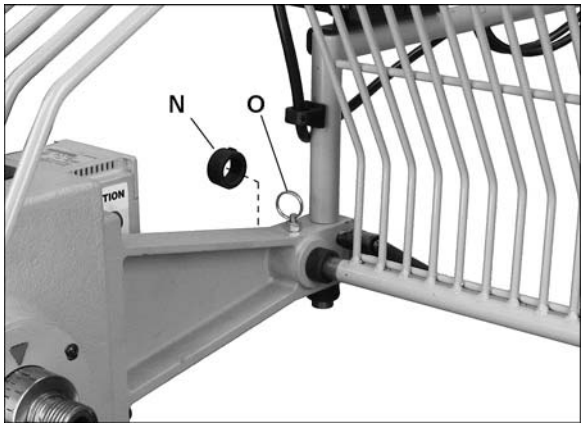



*Figure 11*

4. The guard can be pivoted to one of two positions: Operating mode, or tilted back for stock loading.
5. Pull up on plunger and begin tilting guard, then release plunger. When guard reaches either of the two positions, plunger will engage. (Swing lamp holder away for guard clearance.)

## 7.9 Air/vacuum system

Connecting pressurized air to the lathe allows use of the air blow gun and the vacuum chuck.

See Figures 12 and 13.

1. Connect blow gun hose (A, Figure 12) to the tee connector.
2. Connect your incoming air supply (90 psi) to the quick connect coupler (B).
3. Attach vacuum adaptor (C) to hose (D) and push adaptor into spindle.

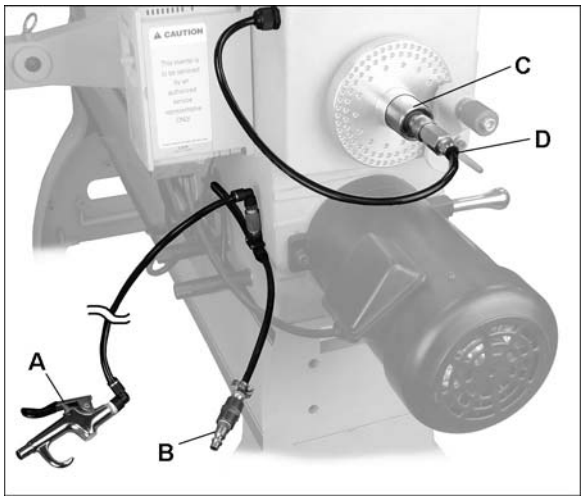



*Figure 12*

4. Install support bracket (E, Figure 13) with knurled screw. This prevents adaptor from backing out during spindle rotation.

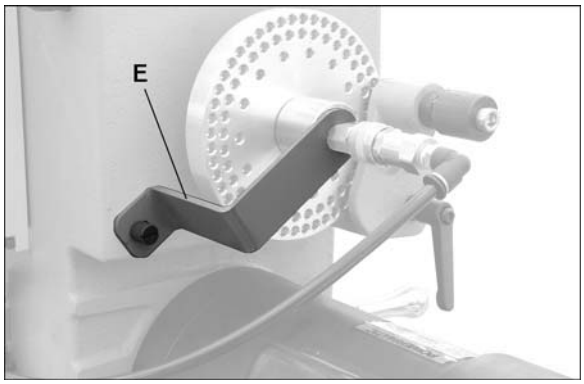



*Figure 13*

## 7.10 Optional accessories

The following items are optional and purchased separately. See your Powermatic dealer for information. If you did not purchase an optional accessory, proceed to section 7.11.

The optional 20-inch bed extension is available in two configurations: Bed Extension only (p/n 6294905) and Bed Extension Kit with elevating and swing-away function (p/n 6294900). The bed extension can be installed to upper or lower sets of holes.

### 7.10.1 20-inch Bed Extension

**Installing Bed Extension only (p/n 6294905)**

Tools required:

10mm hex key

1. Slide tailstock away from edge of bed.
2. Have an assistant hold bed extension flush to end of lathe bed, and insert four screws with washers (provided with bed extension). Snug screws just enough to hold bed extension to lathe bed.
3. Adjust extension bed to lathe bed, aligning the surface and the inside ways as closely as possible.

   **IMPORTANT:** Top surface of bed extension **must** be flush with surface of lathe bed, and inside ways must be aligned, to allow smooth movement of tailstock across joint.
4. Slide tailstock over joint where beds meet, so that clamping nut is centered over joint (Figure 14). Lock tailstock clamping handle; this will align the beds.
5. Tighten screws in extension bed.
6. Unlock tailstock and slide it back and forth to test smoothness of joint.

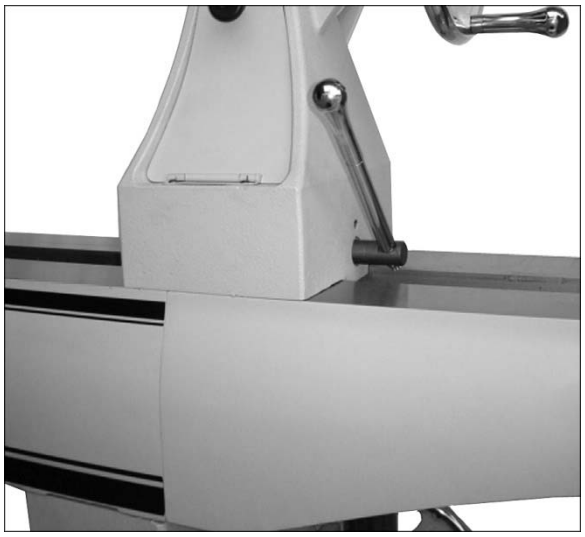


*Figure 14*

7. Unscrew stop bolt from lathe bed (Figure 15), and insert it into hole at end of bed extension.

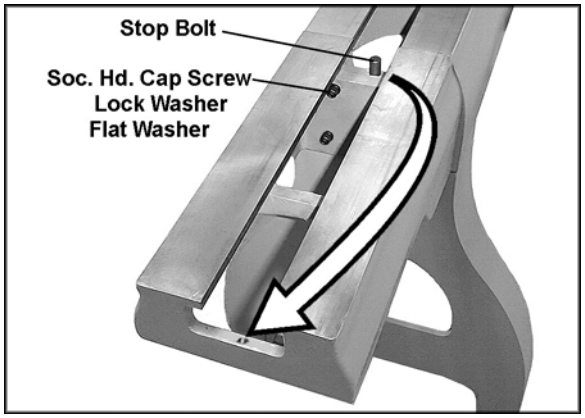



*Figure 15*

### 7.10.2 **20” Bed Extension Kit (6294900)**

Tools required:

8mm hex key

10mm hex key

Straight Edge

1. Slide tailstock away from edge of bed.
2. Place a straight edge against bed and raised area of leg (Figure 16). These two areas should be flush. If they are not, support the lathe (with fork lift, hoist, etc. – USE CAUTION!) and loosen the screws holding leg to bed. Nudge leg as needed, then retighten screws firmly.
3. Install 20-inch bed extension in the same manner as described in *section 7.10.1.*

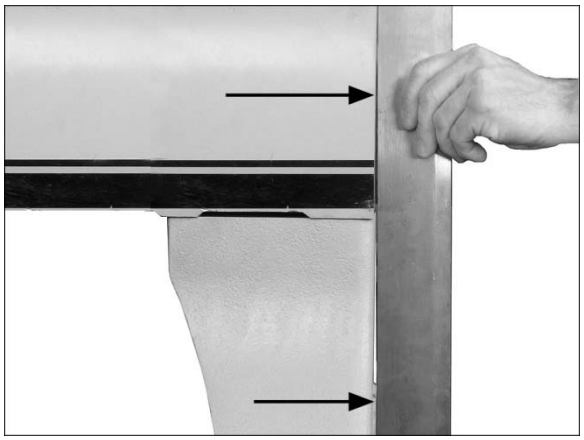


*Figure 16*

4. Install elevating system (Figure 17) to bed extension with four 3/8" screws and washers, and to lathe leg with three 1/2” screws and washers (A, Figure 17). Note that top screw is installed from *inside* the leg and secured with the nylon nut (B). Refer to exploded view, *section 17.5.1* if clarification is needed.
5. Install handwheel and tighten setscrew.

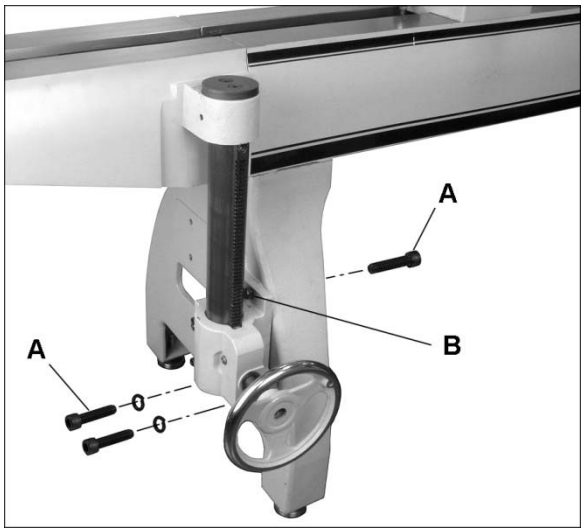



*Figure 17*

Remove screws in bed extension to swing away the bed, or to move bed to lower set of holes. Note: If heavy loading makes handwheel turning difficult, a 19mm wrench can be used to turn hexagonal shaft (Figure 18).

For outboard turning, where headstock is moved to opposite end of lathe to accommodate large bowl blanks, you can (1) mount the 20-inch bed extension to the lower set of holes on the Lathe frame, and (2) mount an extension post [included with kit] to the tool rest base. See Figure 19.

For larger outboard work, an outboard turning stand (# 6294732) is available; see *section 13.0, Optional Accessories.*

*Figure 18*

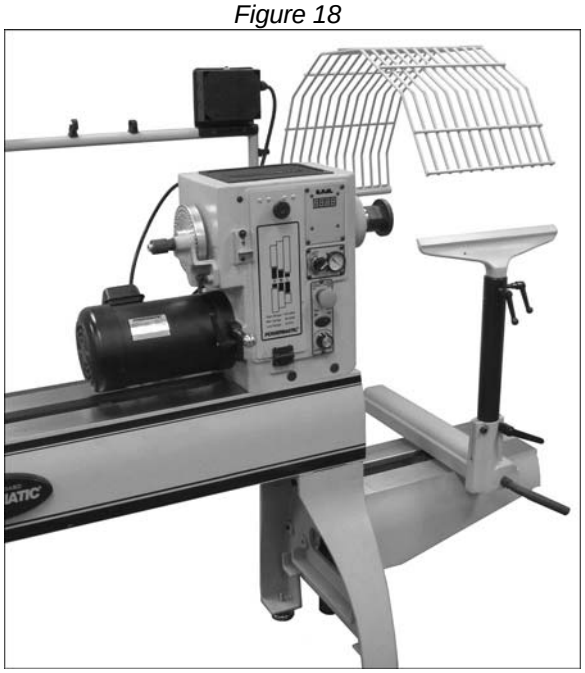


*Figure 19*

### 7.10.3 **63-inch Bed Extension**

Tools required:

10mm hex key

Dead blow mallet (or hammer with wood block)

The optional 63-inch bed extension with leg assembly is mounted to the upper set of holes in similar fashion to the 20-inch bed extension. Install leg first, level with leveling feet, then attach to lathe.

## 7.11 **User-made shelf assembly**

The double ledges inside the lathe legs provide support for a shelf (not provided), which is convenient for storing larger items while keeping them easily accessible.

Figures 20/21/22 illustrate three methods of creating a shelf, using common lumber and basic tools.

**IMPORTANT TIP**: It is unlikely that a full-size shelf can be completely built and then inserted between the Lathe legs. Therefore, construct the shelf in pieces and insert screws only *after* the shelf has been established beneath the Lathe.

**Shelf Style 1** (Figure 20)

Lay two 2x6 boards flat upon the inner ledges.

**Shelf Style 2** (Figure 21)

Lay two 2x6's (or 2x4's) on edge into the outer ledges.

Cut two pieces from a plywood board, and screw them to the top edges of the 2x6's. Make the plywood pieces flush with the outside edge of the 2x6's. A more refined appearance is achieved by cutting a rabbet on the inside edge of the 2x6 and recessing the plywood (as shown).

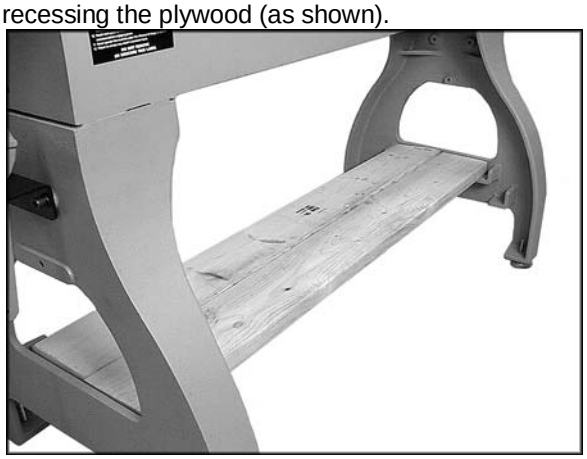


*Figure 20*

*Figure 21*

**Shelf Style 3:** (Figure 22)

This is a basket-style shelf consisting of two 2x6's and dowel rods. The advantage of this design is that most wood chips will fall through the shelf instead of accumulating on it. The instructions below are for building the shelf shown in Figure 22.

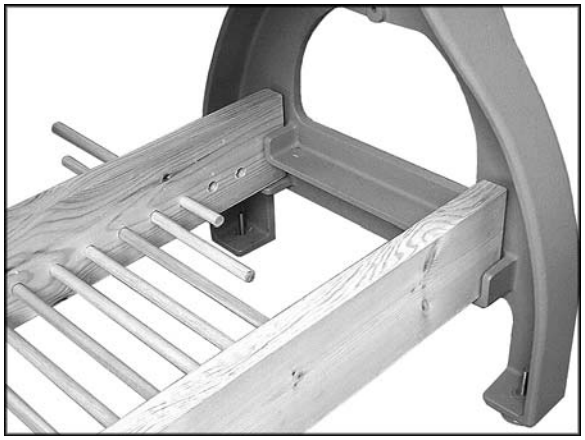


*Figure 22*

*Materials used:*

2 – 2x6's (cut to length).

10 – wood dowels, 4' length, 5/8" diameter.

1. Mark your hole centers (2" centers) along the length of a 2x6. Place the holes so that the tops of the dowels will be even with the tops of the ledges on the Lathe. Also, adjust your hole centers as necessary so that the first and last dowel will begin at approximately the same distance from the ledge at both ends of the Lathe.
2. Use a 5/8" spade bit chucked in a drill press or in a portable drill. Bore the holes *through* one 2x6; this will be the rear piece.
3. On the other 2x6, do not bore through but only deep enough to securely hold the ends of the dowel rods. This will be the front piece and will provide a pleasing appearance at the front of your Lathe.
4. When all holes have been bored, place the 2x6's on edge in the outer ledges of the Lathe.
5. Cut the dowel rods to length with a miter saw or hand saw, so that after insertion the rods will be flush with the back of the rear 2x6.
6. Insert the dowel rods through the holes in the rear 2x6, as shown in Figure 22.
7. A strip of wood can be screwed to the rear 2x6 to cover the dowel holes and prevent the dowels from working out.

# 8.0 Electrical connections

**⚠WARNING** Electrical connections must be made by a qualified electrician in compliance with all relevant codes. This machine must be properly grounded to help prevent electrical shock and possible fatal injury.

The 4224B Lathe will operate on single phase or three phase, 230 volt power supply.

Make sure the characteristics of your power supply match the power specifications on the lathe inverter.

Before connecting to power source, be sure switch is in off position.

It is recommended that the lathe be connected to a dedicated 20 amp circuit with a 20 amp circuit breaker or time-delay fuse marked "D". **Local codes take precedence over recommendations.**

## 8.1 Single phase operation

A three wire pigtail for use on 230 volt single phase power is attached to the inverter and may be "hard-wired" to the power source, or connected to a UL/CSA listed receptacle plug.

Connect the 230 volt supply to the black and white leads and ground the green lead.

If you are hard-wiring the Lathe to a panel, make sure a disconnect is available for the operator. During hard-wiring of the Lathe, make sure the fuses have been removed or the breakers have been tripped in the circuit to which the Lathe will be connected. Place a warning placard on the fuse holder or circuit breaker to prevent it being turned on while the machine is being wired.

## 8.2 Three phase operation

If three phase power is used, it will be necessary to replace the pigtail wire attached to the inverter with a 12/4 wire and connect the three hot leads to the inverter at R, S, T as shown in the wiring diagram in *section 18.0*. Always connect the ground lead.

## 8.3 Variable frequency drive

The lathe uses a Variable Frequency Drive – also called an A.C. Inverter – to provide infinitely variable spindle speeds within the specified ranges. The inverter controls the speed of the motor by varying the frequency of the voltage supplied to the motor. The inverter provides an acceleration ramp that eliminates the shock of normal starting. Also, a braking feature eliminates long coasting periods after the lathe is turned off.

The 3-horsepower motor is specially designed for use with inverter drives, and is balanced to reduce noise and minimize vibration.

The inverter does not require any programming; it has been pre-programmed from the factory. **The buttons on the face of the inverter should never be pushed at any time.** Use only the controls on the front of the headstock.

If you suspect a problem with the inverter or its settings, contact Powermatic technical service at 1-800-274-6846.

**⚠CAUTION** A lightning strike or power surge may cause the inverter to fail. When lathe is not in use, disconnect power plug, or have a 3- or 4-pole disconnect installed on the power side.

## 8.4 **Extension cords**

An extension cord is not recommended; try to position equipment within reach of the power source. If an extension cord becomes necessary, be sure it is heavy enough to carry the current your product will draw. An undersized cord will cause a drop in line voltage resulting in loss of power and overheating.

Table 1 shows recommended size to use depending on cord length and nameplate ampere rating. If in doubt, use the next heavier gauge. The smaller the gauge number, the heavier the cord.

| Ampere Rating | | Volts | Total length of cord in feet | | | |
|---|---|---|---|---|---|---|
| More Than | Not More Than | 120<br>240 | 25<br>50 | 50<br>100 | 100<br>200 | 150<br>300 |
| | | | AWG | | | |
| 0 | 6 | | 18 | 16 | 16 | 14 |
| 6 | 10 | | 18 | 16 | 14 | 12 |
| 10 | 12 | | 16 | 16 | 14 | 12 |
| 12 | 16 | | 14 | 12 | Not Recommended | |

*Extension Cord Recommendations*
*Table 1*

# 9.0 **Adjustments**

## 9.1 **Headstock/tailstock movement**

To slide headstock, loosen locking cams at rear (see A, Figure 3) with provided wrench. Always retighten cams before operating lathe.

To slide tailstock, swing locking handle (B, Figure 23) to upright position. Push locking handle forward or back to tighten tailstock in place.

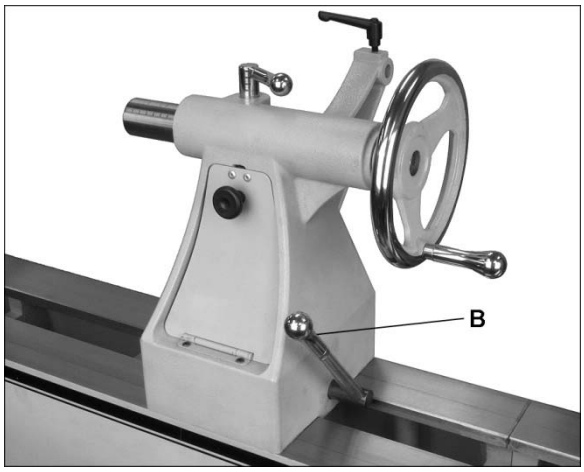



*Figure 23*

To remove headstock, tailstock or toolrest base from bed, unscrew and remove either of the stop bolts (see B, Figure 3). After remounting these items on the Lathe, reinstall stop bolt(s).

For most turning operations, except outboard turning, the headstock should be positioned at left end of bed, and only the tailstock moved to accommodate the workpiece.

## 9.2 **Cam tightness**

If headstock, tailstock or tool rest base does not tighten properly against bed when locking handle is tightened, it may need adjusting. Figure 24 uses tailstock as example:

1. Remove stop bolt on end of lathe bed, and slide tailstock off.
2. Turn tailstock on its side, and slightly tighten lock nut with a wrench. (Headstock has two nuts.)
3. Mount tailstock on bed and verify adjustment. Repeat as needed.
4. Reinstall stop bolt.

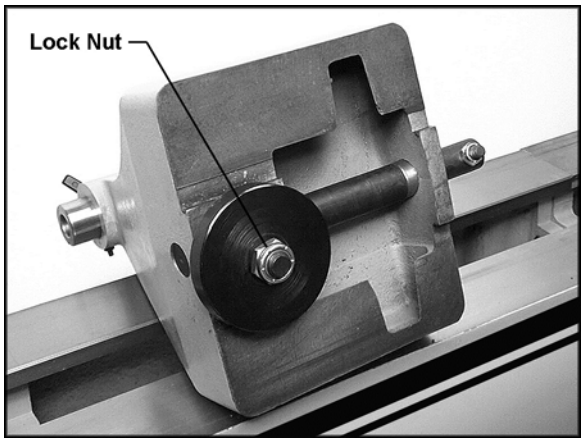



*Figure 24*

## 9.3 **Tool support**

A 14” tool support is provided with your lathe. It is designed to allow adjustment for height, position on the bed, and angle to the work.

Loosen locking handle on tool support base (C, Figure 25) to slide support base forward or back, and to angle it to the bed. Tighten locking handle firmly before operating lathe.

Loosen handle (D, Figure 25) to raise or lower tool support and angle it to the work. Tighten handle before operating lathe. If tool rest post begins to slip, tighten screw (E, Figure 25).

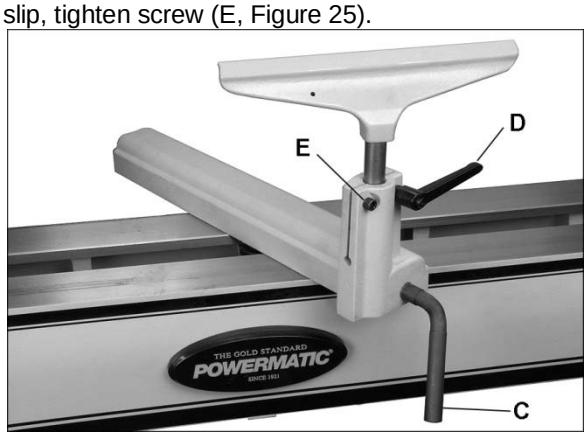



*Figure 25*

## 9.4 **Locking handles**

Locking handles, such as D, Figure 25, are adjustable. Simply lift out on handle, rotate it on the pin, then release it, making sure it seats itself on the pin.

## 9.5 **Live center and cone**

The live center cone, shown in Figure 26, screws clockwise onto the threads of the live center body.

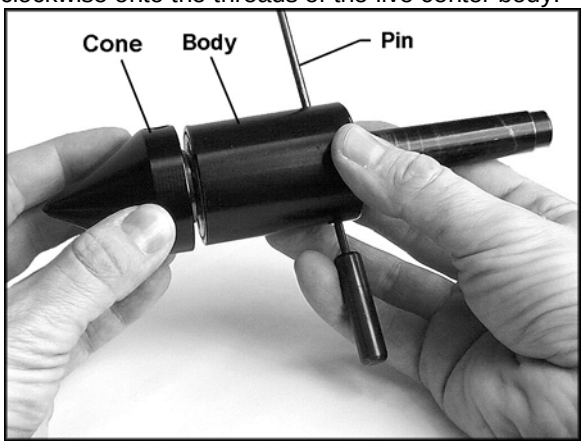



*Figure 26*

To remove cone from live center, first insert live center pin through hole in live center body as shown in Figure 26. If pin will not insert at first, rotate cone until pin can be inserted. The cone can now be removed by holding body stationary while unscrewing cone.

## 9.6 **Indexer**

The indexer is used to create evenly spaced features in a workpiece, while keeping the lathe spindle locked; for example, when cutting flutes on a spindle blank with a router, while the spindle blank is secured between lathe centers.

Index positions are inscribed on the spindle, matching hole locations on the handwheel.

To use indexer (Figure 27):

1. Loosen handle (A) and position arm until indexer pin aligns with the desired array of holes.

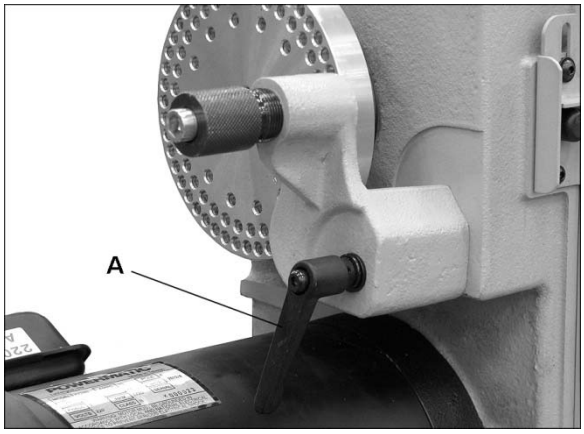



*Figure 27*

2. Rotate spindle to position by observing scale on spindle.
3. Push indexer knob until pin enters handwheel hole. Rotate indexer knob to engage threads and secure handwheel.

   NOTE: Tighten indexer knob only enough until pin fully engages hole and spindle will not turn. Do not overtighten, as this could cause slight deflection in the spindle.
4. Perform the operation upon the workpiece.
5. Unscrew knurled knob until indexing pin releases; turn handwheel to next indexing position, and re-engage indexing pin.

IMPORTANT: Release index pin before turning on lathe.

The indexer assembly can be removed from the lathe by loosening and removing locking handle (A, Figure 27).

## 9.7 Centers: Installing/removing

1. Disconnect lathe from power source.
2. To *install* a spur center or live center (a spur center should first be mounted to your workpiece; see *section 11.4*), clean tapered end of center and inside of headstock taper spindle, then push center into headstock spindle.
3. To *remove* a spur center or live center, first remove workpiece from lathe. Insert knockout rod (Figure 28) through hole in handwheel and firmly tap the tapered end of spur center. The sliding collar on the knockout rod helps give the necessary impact without having to use a mallet against the end of the rod.

   **IMPORTANT:** Hold the center by either placing your thumb and forefinger on outside diameter of spur center, or wrapping center with a rag. The center can be damaged if allowed to fall.

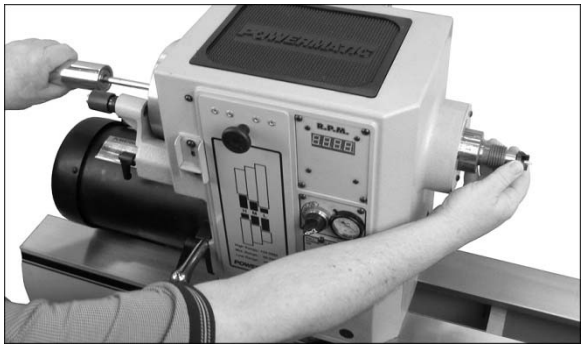


*Figure 28*

## 9.8 Spindle lock

1. Push spindle lock button (see G, Figure 33), and rotate spindle slightly until button goes entirely into recess. Slide plate down over button.
2. Rotate spindle by hand until it locks.
3. Slide plate upward to release spindle.

IMPORTANT: Always release spindle lock before turning on lathe.

## 9.9 Face plate: Installing/removing

1. Disconnect lathe from power source.
2. Mount face plate to your bowl blank.
3. Lock spindle.
4. Install face plate onto threads of headstock spindle and rotate clockwise hand-tight. When lathe is turned on (forward rotation), the rotational force will snug the face plate even farther onto the threads.
5. Face plate is now ready for turning.

**⚠WARNING** **If at any time you will be *reversing* spindle rotation, make sure the two set screws in the face plate are tight! Failure to do this may cause the face plate to loosen from the headstock spindle.**

6. To *remove* face plate, **loosen the two set screws.** Engage spindle lock, and turn face plate counterclockwise with face plate wrench.

## 9.10 Vacuum chuck: Installing/removing

1. Disconnect lathe from power source.
2. Lock spindle.
3. Install vacuum chuck onto threads of headstock spindle and rotate clockwise hand-tight. When lathe is turned on (forward rotation), the rotational force will snug the vacuum chuck even further onto the threads.
4. Make sure vacuum adaptor is inserted into handwheel, and air supply is connected. Turn on air system and place workpiece against vacuum chuck.

**⚠WARNING** **If at any time you will be *reversing* spindle rotation, make sure the set screws in the vacuum chuck are tight! Failure to do this may cause vacuum chuck to loosen from headstock spindle.**

5. To *remove* vacuum chuck, turn off air supply, and loosen the two set screws. Engage spindle lock, and turn vacuum chuck counter-clockwise with face plate wrench.

## 9.11 Comparator

The spindle comparator consists of two comparator centers inserted into the brackets at rear of lathe. The comparator is used to mount a finished, or "reference" spindle, from which measurements can be taken, the measurements being transferred to the new piece being turned.

**⚠WARNING** **Guard must be removed to use spindle comparator. Use caution and wear a face mask when turning without guard installed.**

1. Remove guard from bracket and swing lamp holder away.
2. Install comparator *spur center* into guard bracket, by lifting up on plunger and inserting comparator spur center until its point is about even with the point of the spur center in the headstock spindle. See Figure 29. The plunger in the bracket should engage one of the holes in the comparator center at this position.

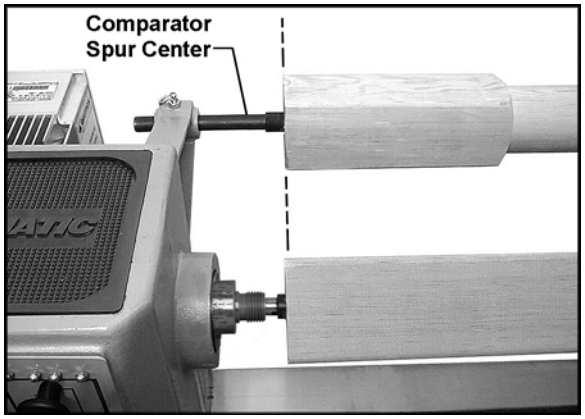



*Figure 29*

3. Install comparator dead center in the comparator bracket and tighten lock handle. See Figure 30.
4. Mount spur center with the spindle blank that you will be turning. Loosen tailstock locking handle, and slide tailstock until live center is about 1-inch from spindle blank, then tighten locking handle. Advance live center using tailstock handwheel, until live center is secured in spindle blank.
5. Mount reference spindle between comparator centers, as shown in Figure 30.

   NOTE: Reference spindle should be mounted last after all adjustment of tailstock and quill has been accomplished with spindle blank. Likewise, when turning operation is complete, remove reference spindle first.

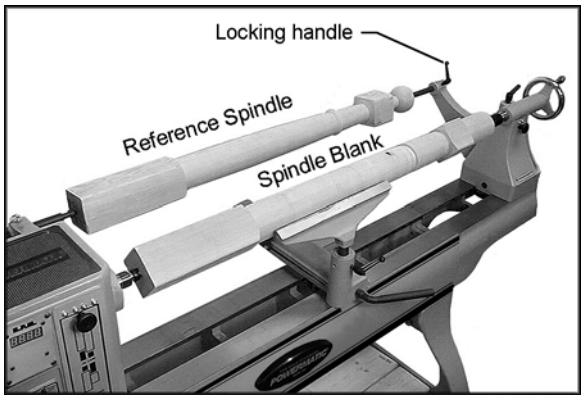



*Figure 30*
*(shown with optional bed extension)*

## 9.12 **Speed change**

1. Disconnect lathe from power source.
2. Open belt access door.
3. Loosen lock handle (A, Figure 31) and lift up handle (B) to raise motor. Tighten lock handle (A) to hold motor in raised position.
4. There should be sufficient slack in the belt to reposition it to the other steps on the sheaves. The label on the access door shows the required belt position.

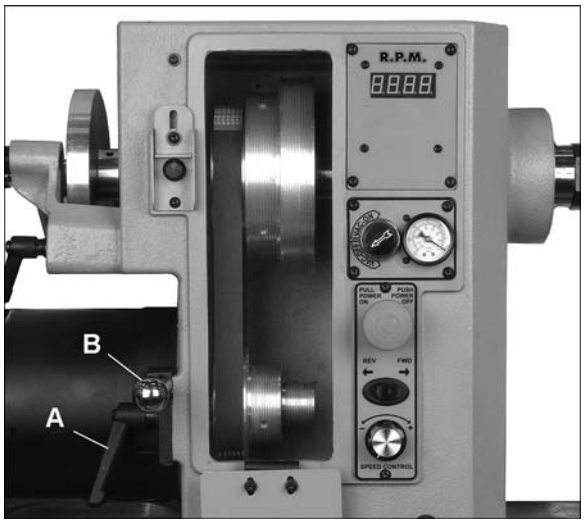



*Figure 31*
*Belt shown in High speed range position*

5. Loosen lock handle (A) and lower motor to tension belt. Be sure that the Poly-V grooves of the belt seat properly in corresponding groove of sheave. Do not overtension; a very light pressure on the tension handle (B) is adequate to prevent belt slippage.
6. Tighten lock handle (A).

## 9.13 **Checking spindle play**

The spindle bearing has been set at the factory for general turning applications. There should be no "end play" or looseness along the spindle's axis. If any looseness should ever occur, it may be rectified by carefully tightening the bearing lock nut on the spindle, as follows. (See Figure 32).

1. Loosen set screws and remove handwheel from headstock.
2. Use a screwdriver to carefully bend back any tabs on the tabbed lock washer (C, Figure 32) that interfere with the insets on the bearing lock nut (D).
3. Place the end of a flat head screwdriver down against one of the insets of the bearing lock nut (D).
4. Tap the handle of the screwdriver with a mallet so that it turns the bearing lock nut (D) tighter in a clockwise direction. Rotate the bearing lock nut only about 1/16" at a time.

**⚠CAUTION** **Do not over-tighten the bearing lock nut or the spindle bearings may overheat during operation.**

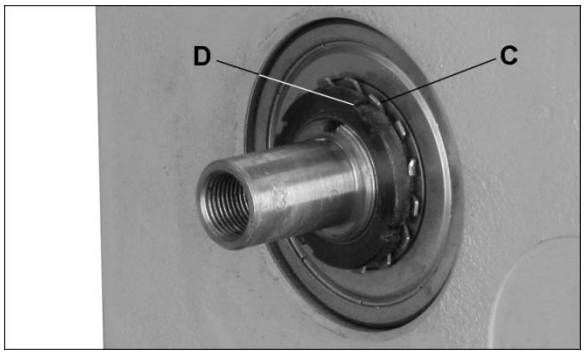



*Figure 32*

5. The bearing lock nut should be tightened just enough to remove end play, and spindle should still rotate freely. Run the lathe for a time, and check for heat from the spindle bearings. If the bearings are running hot, the bearing lock nut is too tight and should be loosened slightly.
6. After the bearing lock nut (D) has been properly adjusted, *carefully* bend back into place any tabs on the tabbed lock washer (C).
7. Reinstall handwheel and tighten set screws.

## 9.14 **Sheave and belt alignment**

The motor and spindle sheaves are aligned with each other at the factory, but if any service is performed that affects their alignment it is very important that they be realigned. To realign them, loosen the two set screws on the spindle sheave (E, Figure 33) with a hex key, and slide spindle sheave into proper position. Re-tighten set screws.

When sheaves and belt are properly aligned, there should be no unusual pulsing sounds or noise coming from the belt.

## 9.15 **Sheave/drive belt replacement**

Replacing the spindle sheave can be a difficult procedure; it is recommended that the headstock be taken to an authorized service center for this.

See Figure 33.

1. Disconnect lathe from power source.
2. Loosen lock handle (A) and lift up handle (B) to raise motor.
3. Tighten lock handle (A) to hold motor in raised position. Slip belt off pulleys.
4. Loosen two set screws on handwheel (F) with a hex key, and pull handwheel off headstock spindle.
5. Loosen and remove bearing lock nut and tabbed lock washer (C/D, Figure 32).
6. Slide spindle a short way out of headstock, just enough to remove sheave or belt.

NOTE: You may have to tap the end of the spindle with a wood block to move it. (**Never** use a steel face hammer directly against the spindle.)

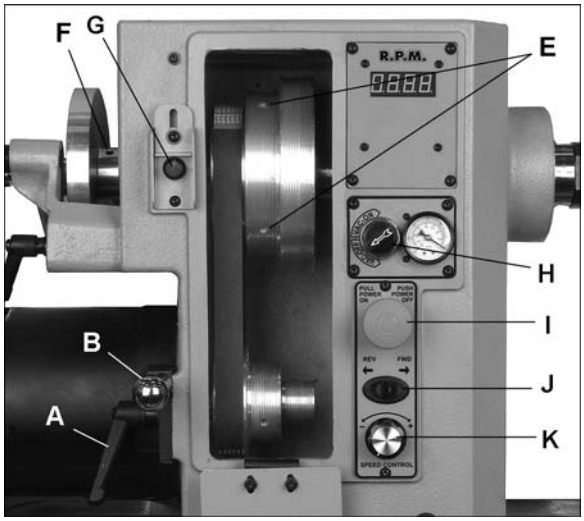



*Figure 33*

7. If replacing spindle sheave, loosen two set screws (E, Figure 33), and slide sheave off spindle.
8. Install new spindle sheave, loosely securing the two set screws. Make sure the sheave is oriented properly.
9. Slide spindle back into place, install tabbed lock washer, and bearing lock nut (C/D, Figure 32). Check for any spindle play at this point (See *section 9.13, "Checking Spindle Play").*
10. Reinstall handwheel and tighten set screws (F, Figure 33).
11. Align new sheave (see *section 9.14, "Sheave and Belt Alignment")* then tighten two set screws (E, Figure 33) securely on sheave.
12. Loosen lock handle and allow motor to lower. Do not overtension; a very light pressure on the tension handle is adequate to prevent belt slippage.
13. Retighten lock handle.

# 10.0 **Operating controls**

See Figures 33 and 34.

(H) Vacuum on/off switch with gauge.

**(I) On/Off (headstock):** Push in to stop lathe; pull out to start.

(J) Forward/reverse

**⚠WARNING When turning with face plate or vacuum chuck, make sure both set screws on the plate/chuck are tight before reversing spindle. Failure to comply may allow face plate/chuck to spin loose from spindle.**

**(K) Speed control dial:** Always start lathe at lowest speed, with dial rotated all the way counterclockwise.

**NOTE:** Do not attempt to alter settings of the Variable Frequency Drive (A.C. Inverter). Use only the controls on the front of the headstock. See *section 8.3* for more information.

**(L) On/off (remote switch):** Lift paddle on switch box to start. Push in to stop. The safety key ($L_1$) can be removed to prevent starting. Safety key must be reinstalled for lathe to start.

**NOTE:** The remote switch will not work if the stop switch on the headstock is engaged. Rotate clockwise to disengage.

The remote switch box has a magnetic backing and can be attached to any metallic surface of the lathe.

If a power outage occurs while operating lathe, the lathe will not automatically restart once power is restored. Cycle the on/off switch in order to restart the machine.

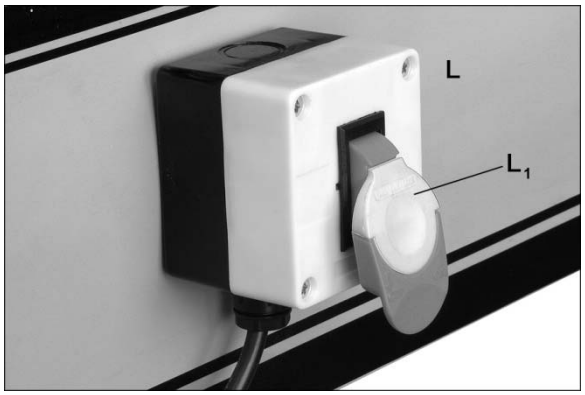



*Figure 34*

# 11.0 **Operation**

The information which follows is general in nature and not intended to be a complete course in woodturning. Nothing can replace the knowledge gained by talking with experienced woodturners or consulting books or trade magazines. Above all, simple trial and error will aid in developing proficiency in the craft.

## 11.1 **Inspection**

Before operating the lathe, check that everything is in proper working order:

1. Level your machine; use the leveling feet to help reduce vibration.
2. Check bearings; adjust only if endplay exists.
3. Check belt; it should be snug but not overly tight.
4. Bed ways; keep clean, use steel wool to remove any rust spots, and apply paste wax to prevent buildup of rust and finishes.
5. Tool support; use a mill file to remove nicks and dings.
6. Spindle tapers; should be clean and free of dust and chips for proper seating of tapers.
7. Tailstock; clean and lubricate quill and locking device.
8. Lighting; proper lighting is essential to eliminate shadows and reduce eye strain.

## 11.2 **Turning Tools**

If possible, select only quality, high-speed steel turning tools. High-speed steel tools hold an edge and last longer than ordinary carbon steel. As one becomes proficient in turning, a variety of specialty tools for specific applications can be acquired. The following tools provide the basics for most woodturning projects (see Figure 35):

**Skews** – 1-1/2" and 1" or 1-1/4", used to make finishing cuts and details.

**Large Roughing Gouge** – 1" to 1-1/4", used to eliminate waste wood.

**Spindle Gouges** – 1/4", 3/8", 1/2", used to turn beads, coves and other details.

**Deep Fluted Bowl Gouge** – 1/4", 3/8" and 1/2", used for turning bowls & plates.

**Square Scraper (Bedan)** – 3/8" or 1/2", used to create square shoulders.

**Large Round Nose (Domed) Scraper** – 1-1/2", used to reduce ridges on interior of bowls, round edges of bowls, etc.

**Parting Tool** - 1/8", used for scraping, making a cut-off, or to set diameters for sizing.

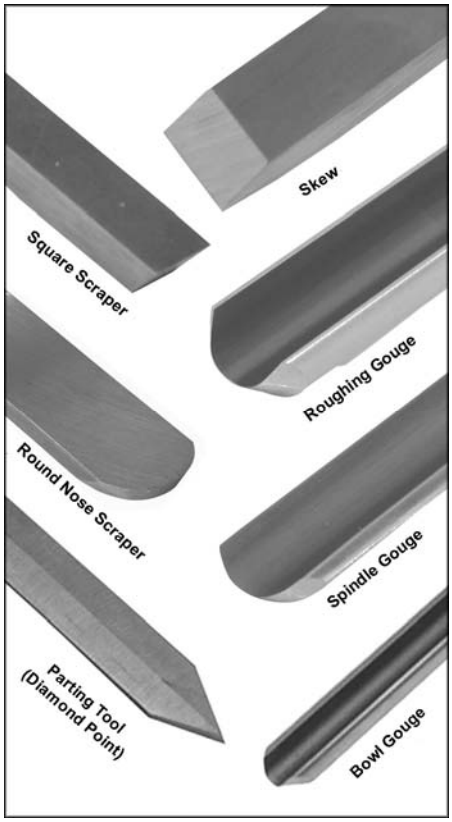



*Figure 35*
*Basic Turning Tools*

For safety and best performance, *keep tools sharp*. If a tool stops cutting or requires excessive pressure to make a cut, it needs to be sharpened. A number of brand name sharpening jigs and fixtures are available; however, a woodturner should learn to sharpen tools freehand.

For best results, use a slow speed grinder (1800 rpm) fitted with a 60-grit aluminum oxide wheel (for shaping) and a 100-grit alum. oxide wheel (for final sharpening and touchup). The grinder should be located near your lathe and at a comfortable height. A diamond dresser will keep the wheels true and eliminate glazing.

Never allow the tool to rest in one place on the wheel, keep it moving and use a light touch.

Carbon steel tools can overheat easily and should be cooled frequently. If the edge turns blue, it has lost its temper and should be ground past the blue area. High-speed steel tools are not as likely to overheat, but can be damaged if allowed to get red hot. High-speed steel tools should not be quenched for cooling. Honing with a diamond lap or slipstone will save trips to the grinder and keep the edge fresh.

## 11.3 **Spindle Turning**

Spindle turning takes place between the centers of the lathe. It requires a spur or drive center in the headstock and a live or dead center in the tailstock. A cup center rather than a cone center in the tailstock will often reduce the risk of splitting the stock.

Figure 36 shows the basic profile shapes in spindle turning.

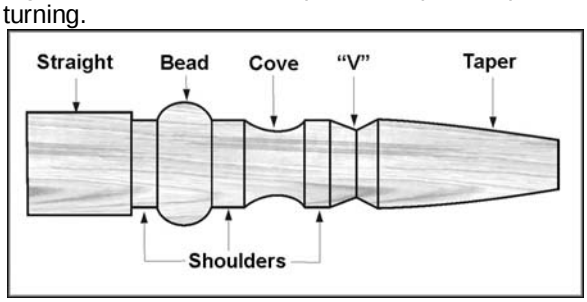



*Figure 36*

## 11.4 **Stock Selection**

Stock for spindles should be straight grained and free of checks, cracks, knots and other defects. It should be cut 1/8" to 1/4" larger than the finished diameter and may require additional length so the ends can be removed later. Larger stock should have the corners removed to produce an octagon making the piece easier to rough down to a cylinder.

1. With a combination square, or plastic center finder for round stock, locate and mark center on each end of the workpiece. Accuracy is not critical on full rounds but extremely important on stock where square sections are to remain. Put a dimple in the stock with an awl or nail, or use a spring-loaded automatic center punch.
2. Extremely hard woods may require kerfs cut into the ends of the stock (Figure 37) using a band saw, so the wood will accept the spur center and the live center.

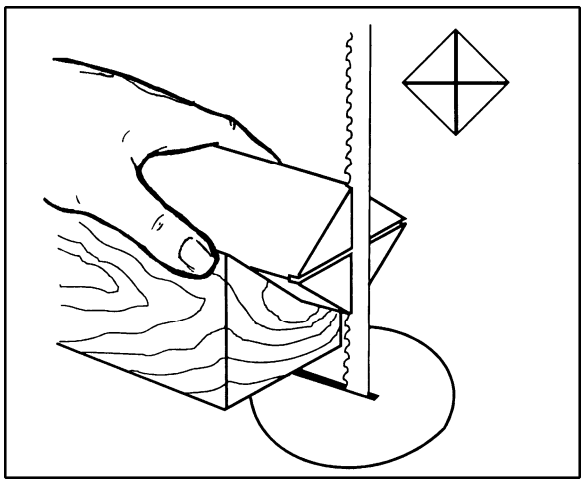


*Figure 37*

3. Drive the spur center about 1/4" into the workpiece, using a wood mallet or dead blow hammer as shown in Figure 38. Be careful that you do not split the workpiece. **Never use a steel face hammer and never drive the workpiece onto the spur center while it is mounted in the Lathe spindle.**

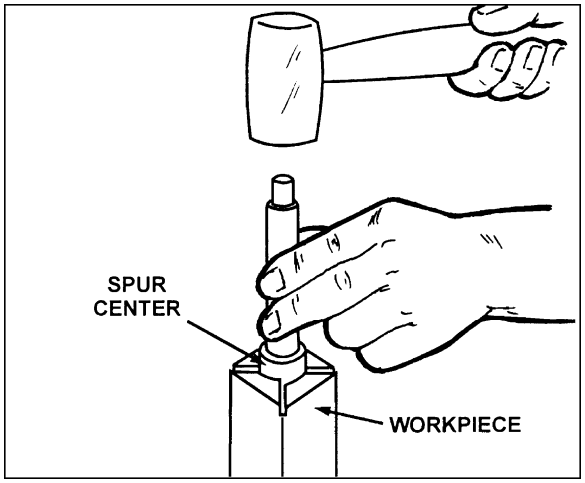



*Figure 38*

4. Make sure headstock is locked to lathe bed.
5. Clean tapered end of spur center and inside of headstock spindle.
6. Insert tapered end of spur center (with the attached workpiece) into headstock spindle.
7. Support the workpiece while bringing the tailstock into position about 1-inch away from end of workpiece. Lock tailstock to bed.
8. Advance tailstock quill with the handwheel in order to seat the live center into the workpiece. Use enough pressure to secure the workpiece between the centers so that it won't fly off, but do not use excessive pressure.
9. Tighten quill locking handle.

**⚠CAUTION The tailstock quill is capable of exerting excessive pressure against the workpiece and the headstock. Apply only sufficient force with tailstock to hold workpiece securely in place. Excessive pressure can overheat center bearings and damage both workpiece and lathe.**

10. Move tool support into position. It should be parallel to workpiece, just below the centerline and approximately 1/8" to 1/4" from the corners of the workpiece to be turned, as in Figure 39. Tighten support base to Lathe bed.
11. Rotate workpiece by hand to check for proper clearance.
12. Start lathe at lowest speed and bring it up to the appropriate RPM for the size of workpiece used. Consult digital readout on the headstock.

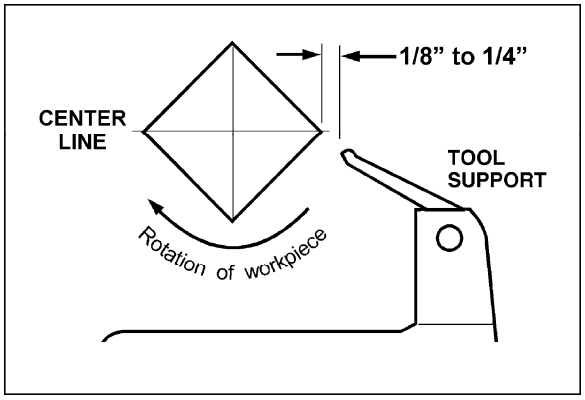



*Figure 39*

## 11.5 Cutting Techniques

### 11.5.1 Roughing Out

1. Begin with a large roughing gouge. Place the tool on the tool support with the heel of the tool on the surface to be cut.
2. Slowly and gently raise tool handle until cutting edge comes into contact with the workpiece.
3. Beginning about 2" from the tailstock end of the workpiece, roll the flute (hollowed-out portion) of the tool in the direction of the cut. See Figure 40. Make long sweeping cuts in a continuous motion to rough the piece down to a cylinder.
4. Keep as much of the bevel of the tool as possible in contact with the workpiece to ensure control and avoid catches. NOTE: Always cut down-hill, or from large diameter to small diameter. Always work *toward* the end of a work-piece, never start cutting at the end.

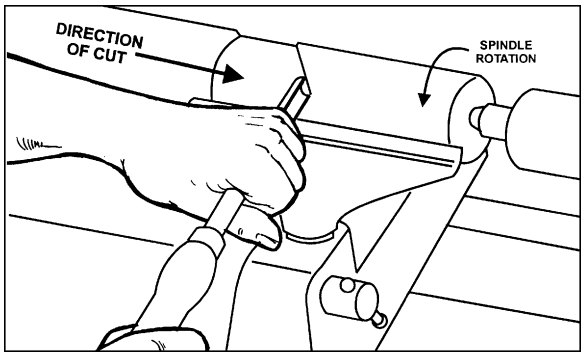



*Figure 40*

5. Once the workpiece is roughed down to a cylinder, smooth it with a large skew. Keep the skew handle perpendicular to the spindle and use only the center third of the cutting edge for a long smoothing cut (touching one of the points of the skew to the spinning workpiece may cause a catch and ruin the workpiece).
6. Add details to the workpiece with skew, parting tool, scraper or spindle gouge.

### 11.5.2 **Beads**

1. Make a parting cut for what is to be a bead to the desired depth. Place the parting tool on the tool support and move tool forward to make the full bevel of the tool come into contact with the workpiece. Gently raise handle to make cut to the appropriate depth.
2. Repeat for other side of the bead.
3. Using a small skew or spindle gouge, start in the center between the two cuts and cut down each side to form the bead. Roll the tool in direction of cut.

### 11.5.3 **Coves**

1. Use a spindle gouge. With the flute of the tool at 90 degrees to the workpiece, touch the point of the tool to the workpiece and roll in towards the bottom of the cove. See Figure 41. **Stop at the bottom; attempting to go up the opposite side may cause the tool to catch.**

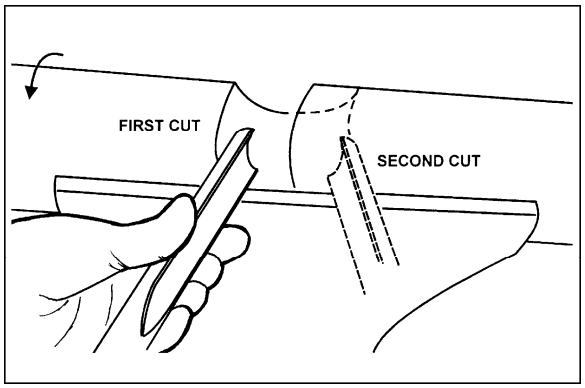



*Figure 41*

2. Move the tool over the desired width of the cove.
3. With the flute facing the opposite direction, repeat step 1 for other side of cove. Stop at bottom of cut.

### 11.5.4 **"V" Cuts**

1. Use the long point of the skew. (NOTE: Do not press the long point of the skew directly into the workpiece to create the "V"; this will result in a burned or burnished "V" with fibers being rolled up at both sides.)
2. Lightly mark the center of the "V" with the tip of the skew.
3. Move the point of the skew to the right half of the desired width of your cut.
4. With the bevel parallel to the right side of the cut, raise the handle and push the tool in to the desired depth, as shown in Figure 42.

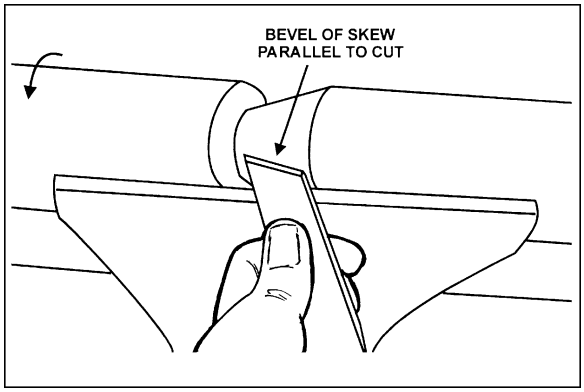



*Figure 42*

5. Repeat from the left side. The two cuts should meet at the bottom and leave a clean "V" cut.
6. Additional cuts may be taken to add to either the depth or width of the cut.

### 11.5.5 **Parting Off**

1. Use parting tool.
2. Adjust lathe speed to lower RPM for parting through a workpiece.
3. Place tool on tool support and raise the handle until it starts to cut and continue to cut toward center of workpiece.
4. Loosely hold on to the piece in one hand as it separates from the waste wood.

### 11.5.6 **Sanding and Finishing**

Leaving clean cuts will reduce the amount of sanding required. Move the tool support out of the way, adjust the lathe to a **low speed**, and begin with fine sandpaper (120 grit or finer). Coarser sandpaper will leave deep scratches that are difficult to remove, and dull crisp details on the spindle. Progress through each grit without skipping grits (for example, do not jump from 120 grit to 220 grit). Fold the sandpaper into a pad; do not wrap sandpaper around your fingers or the workpiece.To apply a finish, the workpiece can be left on the lathe.

Turn off lathe and use a brush or paper towel to apply the finish. Remove excess finish before restarting lathe. Allow to dry and sand again with 320 or 400 grit sandpaper. Apply second coat of finish and buff.

## 11.6 **Face Plate and Bowl Turning**

Face plate turning is normally done on the inboard side of the headstock over the bed. Larger workpieces must be turned on the outboard side (remove tailstock and tool support base, and slide headstock to opposite end of bed).

### 11.6.1 **Mounting Stock**

Use of a face plate is the most common method for holding a block of wood for turning bowls and plates:

1. Select stock at least 1/8" to 1/4" larger than each dimension on the finished workpiece.
2. Always select the largest diameter face plate that can be used for the workpiece to be turned.
3. True one surface of the workpiece for mounting against the face plate.
4. Using the face plate as a template, mark the location of the mounting holes on the workpiece, and drill pilot holes of the appropriate size. Face plates are drilled for No. 12 screws. (Phillips and square drive screws will hold up better than slotted screws. Sheel metal screws are case hardened with deeper and sharper threads than wood screws.)

If the mounting screws on the face plate interfere with the workpiece, a glue or waste block can be used:

5. Make a block the same diameter as the face plate, Figure 43. Both waste block and workpiece should have flat surfaces for gluing.
6. Glue the block to the workpiece. Avoid using brown paper or newspaper between the waste block and workpiece. It may work fine if you are using scrapers, but a slight catch with a bowl gouge can separate the two.

NOTE: When using a waste block, be careful with the adhesive you select. Dry workpieces can be bonded with ordinary white or yellow glue but must be clamped to ensure a good bond. Green workpieces require cyanoacrylate type glue.

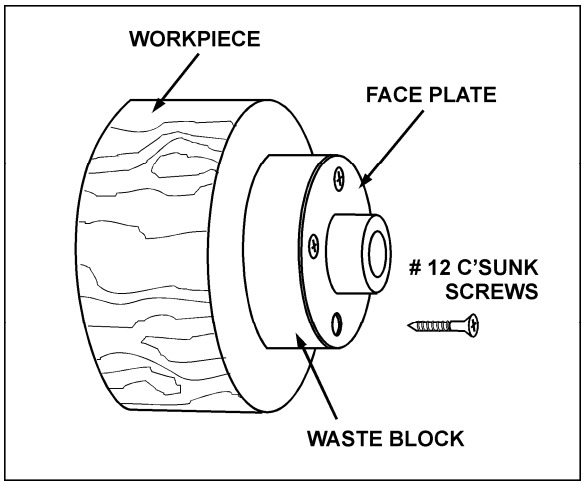



*Figure 43*

### 11.6.2 **Faceplate or Chuck?**

While faceplates are the simplest, most reliable method of holding a block of wood for turning, chucks can also be used. As there are dozens of chucks to choose from, the woodturner should first consider all the different types of turning that will be done, and read reports or discuss with other turners who own chucks before making a decision.

A chuck is not a requirement, but is handy when working on more than one piece at a time. Rather than removing screws, you simply open the chuck and change workpieces.

The most popular ones are four jaw scroll chucks with a variety of jaws to accommodate different size tenons. Most also come with a screw chuck as well.

### 11.6.3 **Wood Selection**

Firewood is the cheapest, most widely available stock to use while learning to turn bowls. Simply waste wood for a while practicing turning techniques. Develop skill with each tool before attempting to make a finished piece. It is best to start with dry wood, without worrying about drying or distortion. Once turning becomes comfortable, try green wood which cuts very easily. As the turner gains experience, he or she will find extraordinary grain and figure in the form of burls, crotches and bark inclusions.

### 11.6.4 **Checks and Cracks**

Green wood will check and crack. For best results, leave logs in as long a length as you can handle. As the material starts to dry, surface cracks will develop on the ends of the log. Cut off two to three inches and you should find good, sound wood. Also cut the log in half along the pith to avoid having it in the finished piece. Most checks radiate from the pith.

As you turn bowls from green wood, make sure you maintain a consistent wall thickness throughout the piece. Leaving a piece thick in some areas and thin in others will cause the wood to dry unevenly and promote checks and cracks.

### 11.6.5 **Distortion**

Distortion is a problem associated with turning green wood. It will vary from one type of wood to the next. Typically, fruitwoods tend to distort more than others. It also varies with the time of year the tree was cut and how the logs are stored.

### 11.6.6 **Tools for Bowl Turning**

The deep fluted bowl gouge is the most essential and versatile tool for most bowl and plate turning. The bowl gouge is heavier and easier to control than other types of gouges. It also allows removal of wood much faster and with less vibration than other gouges. Most average sized bowl work can be accomplished with a 3/8" or 1/2" bowl gouge.

A 1/4" bowl gouge is best suited for smaller bowls and light finishing cuts. Larger 3/4" and 1" bowl gouges are only used for extremely large pieces.

Large domed scrapers can also be used to help clean up the interior surfaces of bowls. A light touch with the scraper slightly tilted will eliminate some of the ridges occasionally left by an inexperienced bowl gouge.

## 11.7 Bowl Turning Techniques

### 11.7.1 To Shape Outside of Bowl

1. Odd shaped burls, crotches and other irregular shaped blanks require special preparation before mounting in a chuck or onto a faceplate. Remove the bark, if there is any, from what appears to be the center of the top of the workpiece.
2. Drive spur center into the top of the workpiece with a mallet or dead blow hammer.
3. Slip the spur center into the headstock taper and bring the tailstock with a live or ball bearing center into position. Lock the tailstock to the bed and advance the tailstock spindle in order to seat the cup center into the workpiece. Tighten the ram locking handle.
4. Turn workpiece by hand to ensure proper clearance.
5. Start lathe at lowest speed and bring it up to the maximum safe speed for the size of work to be turned. If the machine starts to vibrate, lower the speed until vibration stops.
6. Rough out the outside of the bowl with the 1/2" deep fluted bowl gouge, holding the handle of the tool firmly against your hip. For best control, use your whole body to move the gouge through the workpiece.
7. As the bowl takes shape, work on the bottom (tailstock end) to accommodate attaching a face plate.
8. Turn a short tenon (about 1/8" long) the size of the hole in the faceplate. See Figure 44. This will allow centering the workpiece when the faceplate is attached.

   (NOTE: If you plan to use a chuck, turn a tenon of the appropriate length and diameter to fit your chuck.)
9. Stop the lathe, remove workpiece and attach face plate or chuck (*see section 11.6.1 "Mounting Stock"*).

   **⚠WARNING The surfaces of faceplate and workpiece should mount flush to each other.**
10. Finish turning the outside of bowl with 1/2" or 3/8" bowl gouge. Leave additional material at base of bowl for support while turning interior. This will be removed later.

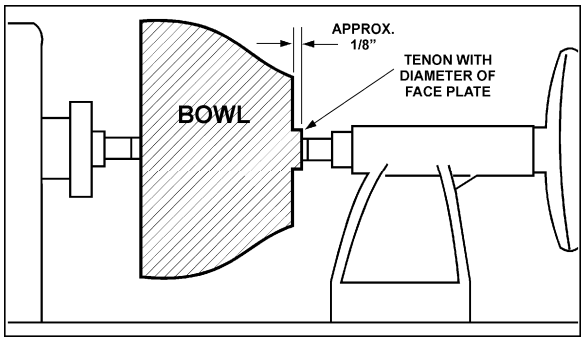



*Figure 44*

### 11.7.2 To Shape Interior of Bowl

1. Stop lathe and move tailstock away. (You may want to remove the center from the tailstock to avoid bumping it with your elbow.)
2. Adjust tool support in front of the bowl just below centerline, at a right angle to the lathe ways.
3. Rotate workpiece by hand to check clearance.
4. Face off top of bowl by making a light shearing cut across the top of workpiece, from rim to center.
5. Place 1/2" bowl gouge on tool support at center of the workpiece with the flute facing top of bowl. The tool handle should be level and pointed toward the four o'clock position, as shown in Figure 45.

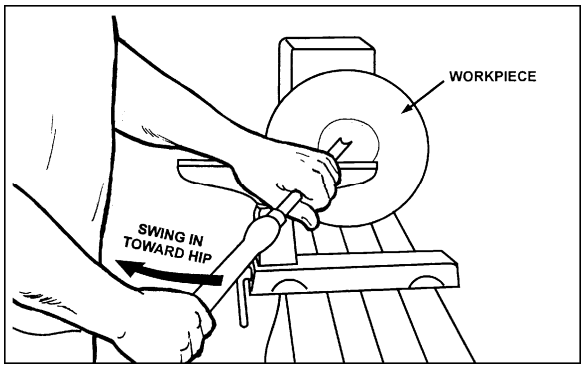



*Figure 45*

6. Use the left hand to control cutting edge of gouge, while right hand swings tool handle toward your body (Figure 45). The flute should start out facing top of workpiece, and rotate upward as it moves deeper into the bowl to maintain a clean even curve. As the tool goes deeper into the bowl, progressively work out toward the rim. It may be necessary to turn the tool support into the piece as you get deeper into the bowl.

   (NOTE: Try to make one, very light continuous movement from the rim to the bottom of the bowl to ensure a clean, sweeping curve through the piece.

   Should there be a few small ridges left, a light cut with a large domed scraper can even out the surface.)

7. Develop wall thickness at the rim and maintain it as you work deeper into the bowl (Once the piece is thin toward the bottom, you cannot make it thinner at the rim). When the interior is finished, move the tool support to exterior to re-define bottom of bowl. (General rule of thumb: the base should be approximately 1/3 the overall diameter of the bowl).
8. Work the tight area around faceplate or chuck with 1/4" bowl gouge.
9. Begin the separation with a parting tool, but do not cut all the way through yet.

### 11.7.3 **Sanding and Finishing**

1. Remove the tool support and adjust lathe speed to approximately 500 RPM. Higher speeds can build friction while sanding and cause heat check in some woods.
2. Begin with fine sandpaper (120 grit) and progress through each grit, using only light pressure. Coarser sandpaper tends to leave deep scratches that are hard to eliminate. Use power-sanding techniques to avoid concentric sanding marks around your finished piece. Avoid rounding over the rim and foot with sandpaper; try to keep details crisp. Finish sanding with 220 grit.
3. Remove sanding dust with tack rags or compressed air and, with lathe turned off, apply first coat of finish. Let stand for several minutes, wipe off excess. Allow to dry before sanding again with 320 or 400 grit sandpaper.
4. Turn lathe back on and continue the separation cut almost all the way through the base. Stop at about 3" and use a small fine tooth saw to separate the bowl from the waste.
5. Apply second finish coat and allow to dry before buffing.

# 12.0 **Maintenance**

**⚠WARNING** Before doing maintenance on the lathe, disconnect it from electrical supply by pulling out the plug or switching off main switch. Failure to comply may cause serious injury.

Maintenance on the 4224B Lathe should be performed at periodic intervals to ensure that the machine is in proper working order, that all fasteners are tight, and all necessary adjustments have been made. Inspection and maintenance should be performed at least twice a year, but more frequently if the lathe receives constant use.

Clean and oil the lathe bed(s) so that headstock, tailstock and tool support base will slide easily. Clean any rust spots that may develop on the bed with a commercial rust remover.

Use compressed air to blow out the interior of the headstock, in order to keep sawdust and chips from accumulating on belts and sheaves. Also blow off debris that accumulates in the motor fan, and on the inverter. **Do not disassemble inverter to clean!**

Frequently clean out the morse tapers on both headstock and tailstock. Commercially available taper cleaners may be acquired from tool stores.

# 13.0 **Optional accessories**

These items, purchased separately, can enhance the functionality of your lathe. Contact your Powermatic dealer for more information.

p/n 6294732 – Heavy duty outboard turning stand

p/n 6294740 – Bowl turning tool support (RH)

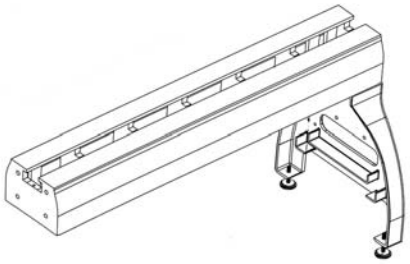
p/n 6294751 – Bowl turning tool support (LH)

p/n 6294739 – Tool support, 6-inch

p/n 6294905 – 20-inch Bed Extension

p/n 6294900 – 20-inch Bed Extension Kit

p/n 6294904 – 63-inch Bed Extension



p/n 6294903 Tailstock Riser Block

# 14.0 **Troubleshooting the 4224B**

| Trouble | Probable Cause | Remedy |
|---|---|---|
| Lathe won't start. | No incoming power. | Check power supply, lead connections |
| | Remote switch stop is active. | Reset remote switch. |
| | Problem with inverter. | Contact Powermatic Technical Service. |
| Motor fails to develop full power. | Undersized wires in power supply system. | Increase supply wire size. |
| | Faulty inverter. | Contact Powermatic Technical Service. |
| | Worn motor. | Replace motor. |
| Motor or spindle stalls or will not start. | Excessive cut. | Reduce depth of cut. |
| | Improper belt adjustment, or worn or broken belt. | Adjust or replace belt as needed. |
| | Improper cooling of motor. | Blow out sawdust from motor housing fan. |
| | Worn spindle bearings. | Replace bearings. |
| | Worn motor. | Replace motor. |
| Excessive vibration. | Workpiece warped, out of round, has major flaw, or was improperly prepared for turning. | Correct problem by planing or sawing workpiece, or discard entirely and use new workpiece. |
| | Worn spindle bearings. | Replace spindle bearings. |
| | Worn drive belt. | Replace drive belt. |
| | Motor mount lock handle is loose. | Tighten lock handle. |
| | Lathe on uneven surface. | Adjust leveling feet. |
| Lathe runs at one speed only. | Potentiometer faulty. | Replace potentiometer. |
| | Electronic AC inverter is not programmed properly, or is defective, or there is loose wiring. | Contact Powermatic Technical Service to help identify problem; 800-274-6846. |
| Tools tend to grab or dig in. | Dull tools. | Keep tools sharp. |
| | Tool support set too low. | Reposition tool support height. |
| | Tool support set too far from workpiece. | Reposition tool support closer to workpiece. |
| | Improper tool being used. | Use correct tool for operation. |
| Headstock moves when applying pressure with Tailstock. | Excessive pressure being applied by tailstock (more than 500 lbs. of force). | Slide headstock to left end, lock firmly, then apply pressure to workpiece with tailstock. Apply *only* sufficient force with tailstock to hold workpiece securely in place. |
| Tailstock moves when applying pressure. | Cam lock nut needs adjusting. | Tighten cam lock nut. |
| | Lathe bed and tailstock mating surfaces are greasy or oily. | Remove tailstock and clean surfaces with a cleaner/degreaser. Re-apply light coat of oil to Lathe bed surface. |

*Table 2*

# 15.0 **Recommended Lathe Speeds** (per diameter of workpiece)

| Diameter of Work | Roughing RPM | General Cutting RPM | Finishing RPM |
|---|---|---|---|
| Under 2” | 1520 | 3000 | 3000 |
| 2” to 4” | 760 | 1600 | 2250 |
| 4” to 6” | 510 | 1080 | 1500 |
| 6” to 8” | 380 | 810 | 1125 |
| 8” to 10” | 300 | 650 | 900 |
| 10” to 12” | 255 | 540 | 750 |
| 12” to 14” | 220 | 460 | 640 |
| 14” to 16” | 190 | 400 | 960 |
| 16” to 20” | 175 | 325 | 450 |
| 20” to 24” | 175 | 260 | 375 |

*Table 3*

# 16.0 **Belt Positions for 4224B**

High: 135-3500
Medium: 80-2000
Low: 40-970

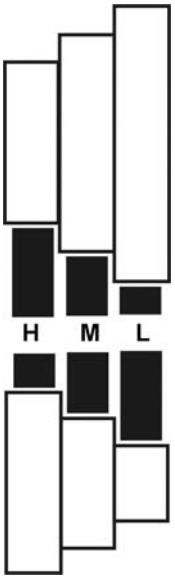
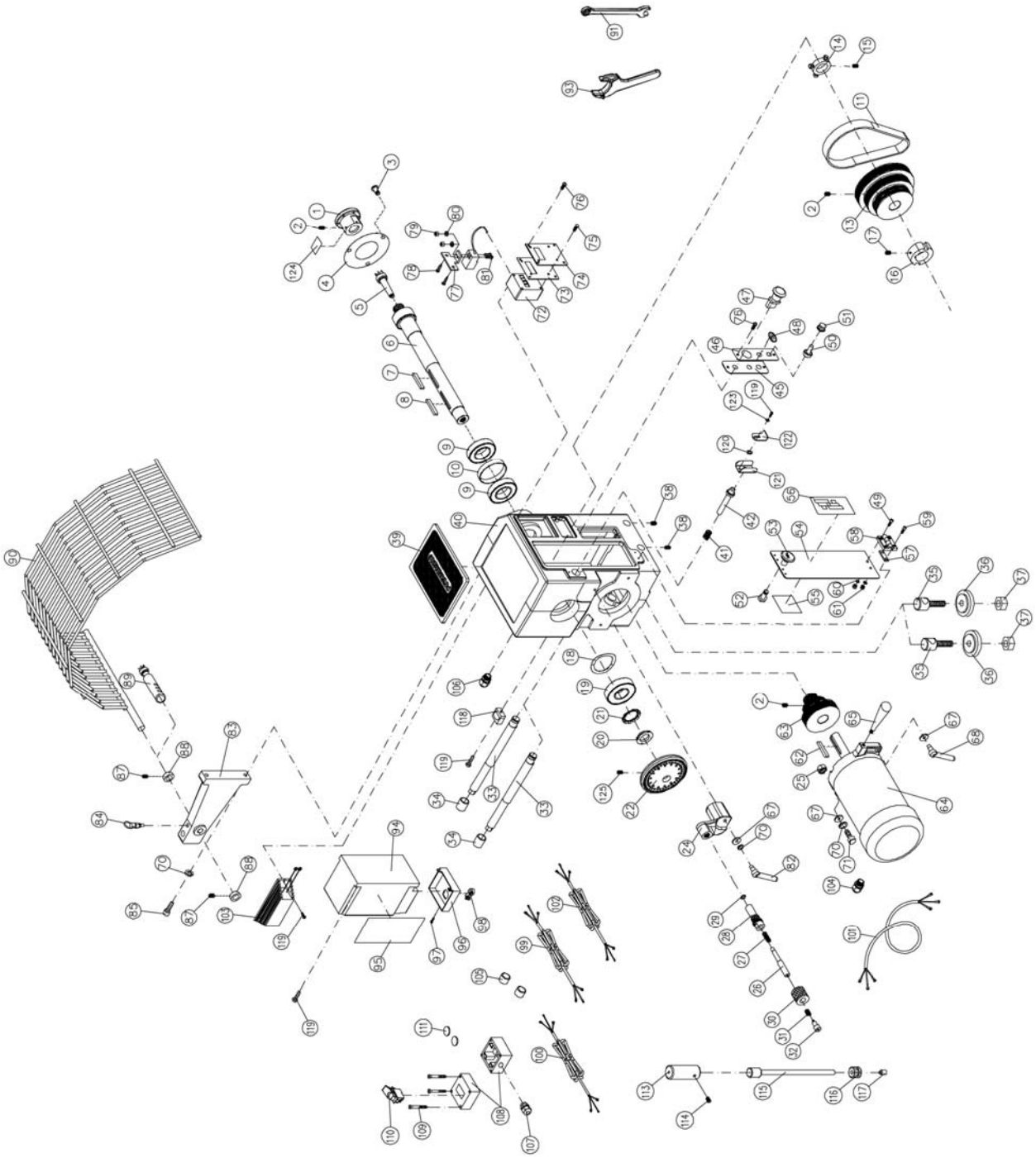



*Figure 46*

# 17.0 **Replacement Parts**

Replacement parts are listed on the following pages. To order parts or reach our service department, call 1-800-274-6848 Monday through Friday (see our website for business hours, www.powermatic.com). Having the Model Number and Serial Number of your machine available when you call will allow us to serve you quickly and accurately.

### 17.1.1 **Headstock Assembly – Exploded View**

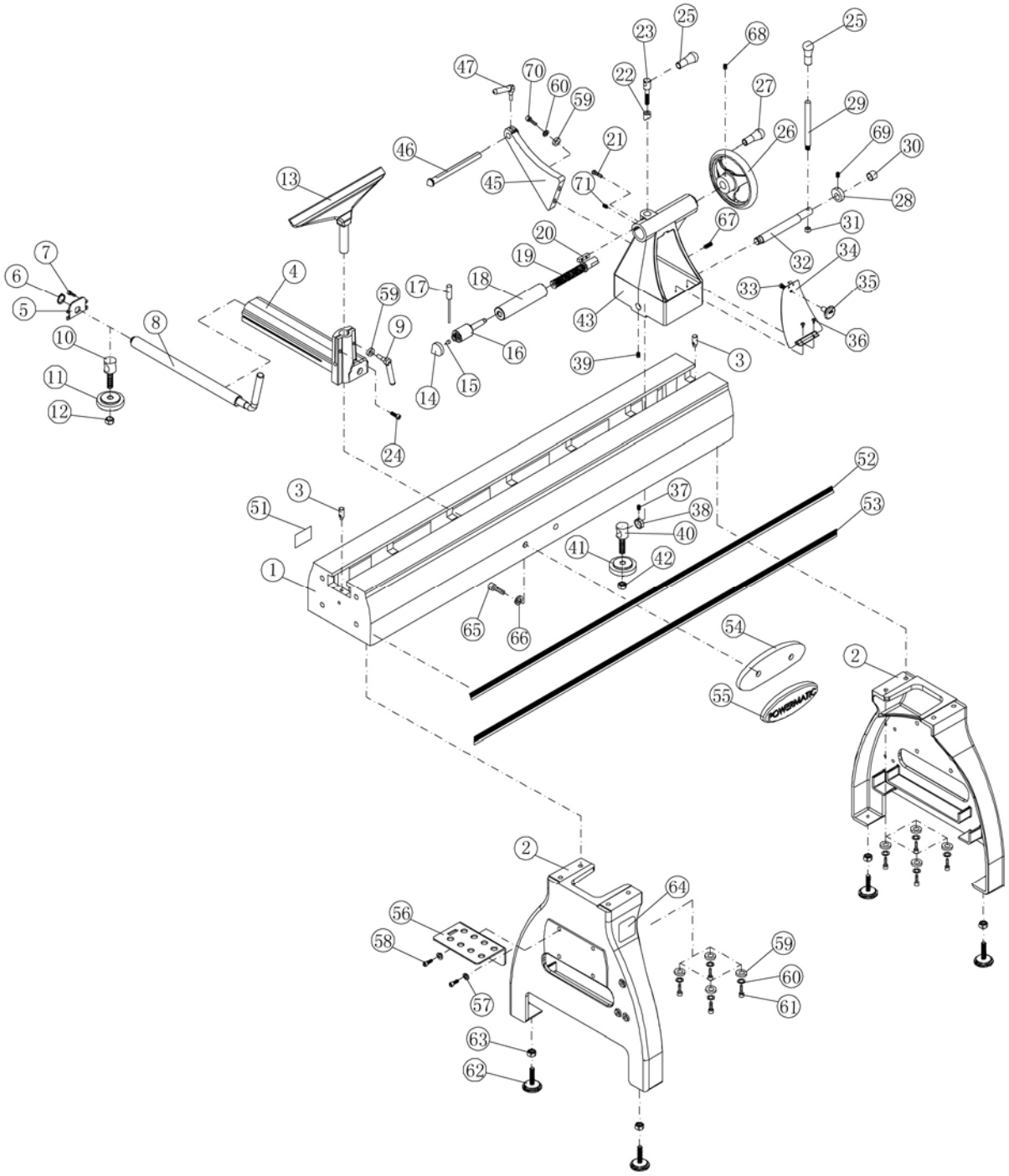


## 17.1.2 **Headstock Assembly – Parts List**

| Index No | Part No | Description | Size | Qty |
|---|---|---|---|---|
| 1 | 6294736 | Faceplate with set screws | 3” | 1 |
| 2 | 6295796 | Nylon Insert Socket Set Screw | 1/4-20 x 3/8” | 6 |
| 3 | TS-0253031 | Socket Head Button Screw | #10-24 x 1/2” | 3 |
| 4 | 6295799 | Front Plate | | 1 |
| 5 | 6294725 | Spur Center | MT2 | 1 |
| 6 | 4224B-106 | Spindle | | 1 |
| 7 | 4224B-107 | Key | 6 x 6 x 90 mm | 1 |
| 8 | 4224B-108 | Key | 6 x 6 x 35 mm | 1 |
| 9 | BB-6209ZZ | Ball Bearing | 6209ZZ | 2 |
| 10 | 4224B-110 | Spacer | | 1 |
| 11 | 4224B-111 | Belt | 290J | 1 |
| 13 | 4224B-113 | Spindle Pulley | | 1 |
| 14 | 4224B-114 | RPM Sensor Collar | | 1 |
| 15 | TS-0270031 | Set Screw | 5/16”-18 x 3/8” | 2 |
| 16 | 4224B-116 | Spindle Lock Collar | | 1 |
| 17 | TS-0267021 | Set Screw | 1/4”-20 x 1/4” | 2 |
| 18 | 4224B-118 | Wave Washer | | 1 |
| 19 | BB-6308ZZ | Ball Bearing | 6308ZZ | 1 |
| 20 | 4224B-120 | Spanner Nut | | 1 |
| 21 | 4224B-121 | Spanner Lock Washer | | 1 |
| 22 | 4224B-122 | Handwheel | | 1 |
| 24 | 4224B-123 | Index Bracket | | 1 |
| 25 | TS-0640091 | Nylon Nut | 3/8”-16 | 1 |
| | 4224B-IPA | Index Pin Assembly *(includes #26 thru 32)* | | 1 |
| 26 | 4224B-126 | Index Pin | | 1 |
| 27 | 6295822 | Spring | | 1 |
| 28 | 6295817 | Index Bushing | | 1 |
| 29 | 4224B-129 | C-Ring | S-8 | 1 |
| 30 | 6295819 | Knurled Locking Knob | | 1 |
| 31 | 6295820 | Spring | | 1 |
| 32 | 6295821 | Hex Socket Bolt | | 1 |
| 33 | 4224B-133 | Headstock Locking Cam | | 2 |
| 34 | 6095038 | Bushing | 7/8” x 1” x 7/8” | 2 |
| 35 | 3058001 | Clamp Bolt | | 2 |
| 36 | 4224B-136 | Cam Locking Disc | | 2 |
| 37 | 6520009 | Nylon Nut | 5/8”-11 | 2 |
| 38 | 4224B-138 | Set Screw | #10-24 x 1” | 2 |
| 39 | 3520B-209 | Headstock Mat | | 1 |
| 40 | 4224B-140 | Headstock Main Casting | | 1 |
| 41 | 6813062 | Spring | | 1 |
| 42 | 3601006 | Spindle Lock Plunger | | 1 |
| 45 | 4224B-145 | Control Panel Cover Plate | | 1 |
| 46 | 4224B-146 | Control Panel Label | | 1 |
| 47 | 6295839 | Push/Pull Switch | | 1 |
| 48 | 4224B-148 | Switch Fwd/Rev | | 1 |
| 49 | 6708019 | Socket Head Cap Screw | #8-32 x 5/8” | 2 |
| 50 | 6295915 | Potentiometer with wiring leads | | 1 |
| 51 | 6430047 | Knob | | 1 |
| 52 | TS-1490021 | Hex Cap Screw | M8 x 16 | 1 |
| 53 | 6295717 | Knob | | 1 |
| 54 | 4224B-154 | Access Door | | 1 |
| 55 | 3520B-294 | Warning Label – Belt Adjustment | | 1 |
| 56 | 4224B-156 | Speed Label | | 1 |
| 57 | 6295911 | Pad | | 1 |
| 58 | 6365012 | Door Hinge | | 1 |
| 59 | 6710015 | Socket Head Cap Screw | #10-24 x 1/2” | 2 |
| 60 | 6860704 | Lock Washer | #8 | 2 |
| 61 | 6508007 | Nut | #8-32 | 2 |
| 62 | 6294761 | Key | 6 x 6 x 45 mm | 1 |
| 63 | 4224B-163 | Motor Pulley | | 1 |

| Index No. | Part No. | Description | Size | Q'ty |
|---|---|---|---|---|
| 64 | 4224B-164 | Motor | 3HP 3PH | 1 |
| 65 | 4224B-165 | Handle | | 1 |
| 67 | TS-0680041 | Flat Washer | 3/8" | 3 |
| 68 | 4224B-168 | Lock Handle | | 1 |
| 70 | TS-0720091 | Lock Washer | 3/8" | 4 |
| 71 | TS-0209091 | Socket Head Cap Screw | 3/8"-16 x 2" | 1 |
| 72 | JWL1642-130A | Digital Readout (DRO) | | 1 |
| | JWL1642-130S | Digital Readout Sensor (not shown) | | 1 |
| 73 | 3520B-238 | DRO Mounting Plate | | 1 |
| 74 | 3520B-239 | DRO Cover Plate | | 1 |
| 75 | JWL1642-127 | Pan Head Self-Tapping Screw | M3 x 10 | 4 |
| 76 | TS-0253031 | Socket Head Button Screw | #10-24 x 1/2" | 7 |
| 77 | 4224B-177 | Bracket | | 1 |
| 78 | JWL1642-134 | Pan Head Self-Tapping Screw | 1/4" x 1/2" | 2 |
| 79 | 4224B-179 | Nylon Nut | M3 | 2 |
| 80 | TS-2361031 | Lock Washer | M3 | 2 |
| 81 | 6295838 | Phillips Round Head Machine Screw | M3 x 20 | 2 |
| 82 | 4224B-182 | Lock Handle | | 1 |
| 83 | 4224B-183 | Guard Bracket | | 1 |
| 84 | 6644005 | Plunger | | 1 |
| 85 | TS-0209061 | Socket Head Cap Screw | 3/8"-16 x 1-1/2" | 2 |
| 87 | TS-0270011 | Set Screw | 5/16"-18 x 1/4" | 2 |
| 88 | 6143004 | Retaining Collar | | 2 |
| 89 | 4224B-189 | Spindle Comparator Spur Center | | 1 |
| 90 | 6294747 | Guard | | 1 |
| 91 | 4224B-191 | Combination Wrench | 19mm | 1 |
| 93 | 6294744 | Face Plate Wrench | 2" | 1 |
| 94 | 4224B-194 | Inverter | | 1 |
| 95 | 3520B-293 | Inverter Caution Label | | 2 |
| 96 | JWL1642-166 | Bottom Cover | | 1 |
| 97 | 3520B-296 | Phillips Pan Head Machine Screw | M3-0.5P x 10 | 3 |
| 98 | JWL1642-165 | Strain Relief | 7N-2 | 3 |
| 99 | 4224B-199 | Control Panel Cord | | 1 |
| 100 | 6295765 | Remote Switch Cord | | 1 |
| 101 | 6294790 | Motor Cord | | 1 |
| 102 | 6294787 | Power Cord | | 1 |
| 103 | JWL1642-169A | Braking Resistor | | 1 |
| 104 | 4224B-1104 | Strain Relief for Motor | PG 13.5 | 1 |
| 105 | 3520B-295 | Cord Snap Ring | | 2 |
| 106 | 4224B-1106 | Strain Relief | M16 | 1 |
| | 6294733 | Remote Switch Assembly *(Includes #100, 107 thru 111)* | | 1 |
| 107 | 6295766 | Strain Relief | | 1 |
| 108 | 6295761 | Remote Switch Box | | 1 |
| 109 | 4224B-1109 | Tap Screw | | 4 |
| 110 | 6295760 | Remote Switch | | 1 |
| | 6295760-1 | Remote Switch Safety Key | | 1 |
| 111 | 4224B-1112 | Magnet | | 2 |
| | 4224B-KRA | Knockout Rod Assembly *(includes #113 thru 117)* | 1 | |
| 113 | 3520B-288 | Slide Hammer | | 1 |
| 114 | TS-0267041 | Set Screw | 1/4"-20 x 3/8" | 2 |
| 115 | 4224B-1115 | Rod | | 1 |
| 116 | 3520B-291 | Collar | | 1 |
| 117 | 3520B-292 | Brass Tip | | 1 |
| 118 | 4224B-1118 | Cord Holder | | 1 |
| 119 | TS-0206031 | Socket Head Cap Screw | #10-24 x 5/8" | 7 |
| 120 | 4224B-143 | Wave Washer | | 1 |
| 121 | 6294786 | Spindle Lock Guard | | 1 |
| 122 | 4224B-1122 | Spindle Lock Tab | | 1 |
| 123 | TS-069204 | Flat Washer | #10 | 1 |
| 124 | 4224B-1124 | Warning Label, Faceplate | | 1 |
| 125 | TS-1523031 | Set Screw | M6 x 10 | 2 |

### 17.2.1 **Bed and Leg Assembly – Exploded View**

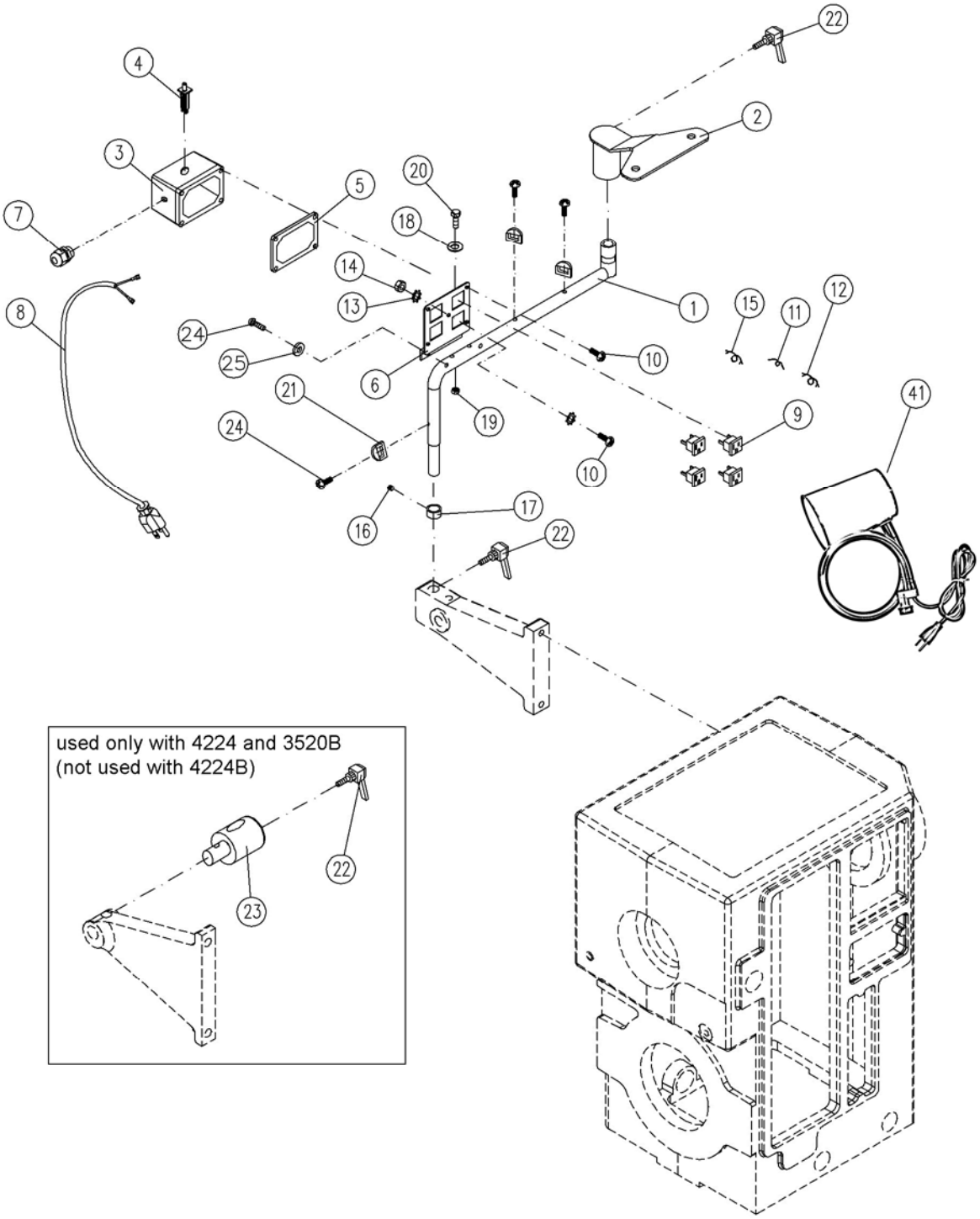


## 17.2.2 **Bed and Leg Assembly – Parts List**

| Index No | Part No | Description | Size | Qty |
|---|---|---|---|---|
| 1 | 4224B-201 | Bed | | 1 |
| 2 | 4224B-202 | Leg | | 2 |
| 3 | 6295754 | Stop Bolt | | 2 |
| 4 | 4224B-204 | Tool Rest Base | | 1 |
| 5 | 4224B-205 | End Cover | | 1 |
| 6 | 3520B-106 | C-Ring | S-22 | 1 |
| 7 | TS-0206021 | Socket Head Cap Screw | #10-24 x 1/2” | 4 |
| 8 | 4224B-208 | Tool Support Cam | | 1 |
| 9 | 4224B-209 | Lock Handle | | 1 |
| 10 | 3520B-110 | Clamp Bolt | | 1 |
| 11 | 6294770 | Cam Locking Disc | | 1 |
| 12 | TS-0650081 | Nylon Lock Hex Nut | 3/4”-10 | 1 |
| 13 | 6294742 | Tool Support | 14” | 1 |
| | 6295902 | Live Center Assembly *(includes #14 thru 17)* | | 1 |
| 14 | 6295905 | Live Center Cap | | 1 |
| 15 | 6295904 | Live Center Tip | | 1 |
| 16 | 6295903 | Live Center Body | | 1 |
| 17 | 6295906 | Live Center Rod | | 1 |
| 18 | 4224B-218 | Quill | | 1 |
| 19 | 4224B-219 | Lead Screw | | 1 |
| 20 | 4224B-220 | Key | | 1 |
| 21 | TS-0253031 | Socket Head Button Screw | #10-24 x 1/2” | 2 |
| 22 | 3728005 | Quill Lock Sleeve | | 1 |
| | 4224B-LBA | Lock Bolt Assembly *(includes #23 and 25)* | | 1 |
| 23 | 4224B-223 | Lock Bolt | | 1 |
| 24 | TS-0209061 | Socket Head Cap Screw | 3/8”-16 x 1-1/4” | 1 |
| 25 | 4224B-165 | Lock Handle | | 2 |
| 26 | 4224B-226 | Handwheel | | 1 |
| 27 | 3520B-126 | Swivel Handle | | 1 |
| 28 | 4224B-228 | Eccentric Collar | | 1 |
| 29 | 4224B-229 | Rod | | 1 |
| 30 | 6095038 | Bushing | 7/8” x 1” x 7/8” | 1 |
| 31 | TS-0640091 | Nylon Lock Nut | 3/8”-16 | 1 |
| 32 | 4224B-232 | Eccentric Cam | | 1 |
| 33 | TS-1490021 | Hex Bolt | M8 x 16 | 1 |
| 34 | 3520B-134 | Storage Cover Plate | | 1 |
| 35 | 6295717 | Knob | | 1 |
| 36 | TS-0253031 | Socket Head Button Screw | #10-24 x 1/2” | 2 |
| 37 | TS-0270011 | Set Screw | 5/16”-18 x 1/4” | 1 |
| 38 | 3096003 | Collar | | 1 |
| 39 | 4224B-138 | Set Screw | #10-24 x 1” | 1 |
| 40 | 3058001 | Clamp Bolt | | 1 |
| 41 | 4224B-136 | Cam Locking Disc | | 1 |
| 42 | 6520009 | Nylon Nut | 5/8”-11 | 1 |
| 43 | 4224B-243 | Tailstock Casting | | 1 |
| 45 | 4224B-245 | Comparator Bracket | | 1 |
| 46 | 3520B-151 | Comparator Dead Center | | 1 |
| 47 | 4224B-247 | Lock Handle | 3/8” x 1-1/4” | 1 |
| 51 | 4224B-251 | I.D. Label | | 1 |
| 52 | 4224B-157 | Upper (Narrow) Stripe | 63” | 2 |
| 53 | 4224B-158 | Lower (Wide) Stripe | 63” | 2 |
| 54 | 3520B-154 | Backer Plate | | 1 |
| 55 | 3520B-140 | Powermatic Nameplate | | 1 |
| 56 | 4224B-256 | Tool Caddy | | 1 |
| 57 | TS-0720111 | Lock Washer | 1/2” | 2 |
| 58 | 4224B-258 | Socket Head Cap Screw | 1/2”-12 x 1” | 2 |
| 59 | TS-0680041 | Flat Washer | 3/8” | 11 |
| 60 | TS-0720091 | Lock Washer | 3/8” | 10 |
| 61 | TS-0209071 | Socket Head Cap Screw | 3/8”-16 x 1-1/2” | 8 |
| 62 | 4224B-262 | Leveling Foot | | 4 |

| Index No. | Part No. | Description | Size | Q'ty |
|---|---|---|---|---|
| 63 | 4224B-263 | Hex Nut | 1/2"-12 | 4 |
| 64 | 6294773 | Warning Label | | 1 |
| 65 | TS-0207071 | Socket Head Cap Screw | 1/4"-20 x 1-1/4" | 2 |
| 66 | TS-0680021 | Flat Washer | 1/4" | 2 |
| 67 | 4224B-267 | Ball Plunger | | 1 |
| 68 | TS-0270031 | Set Screw | 5/16"-18 x 3/8" | 2 |
| 69 | TS-0267021 | Set Screw | 1/4"-20 x 1/4" | 1 |
| 70 | TS-0209061 | Socket Head Cap Screw | 3/8"-16 x 1-1/4" | 2 |
| 71 | TS-0267041 | Set Screw | 1/4"-20 x 3/8" | 1 |
| | 4224B-TA | Tailstock Assembly Complete *(includes #18-23;25-42,67-69,71)* | | 1 |
| | 4224B-HP | Hardware Package *(includes all parts below)* | | |
| | TS-0680041 | Flat Washer | 3/8" | 10 |
| | TS-0720091 | Lock Washer | 3/8" | 12 |
| | TS-0209071 | Socket Head Cap Screw | 3/8"-16 x 1-1/2" | 10 |
| | TS-0209061 | Socket Head Cap Screw | 3/8"-16 x 1-1/4" | 2 |
| | TS-0720111 | Lock Washer | 1/2" | 2 |
| | 4224B-258 | Socket Head Cap Screw | 1/2"-12 x 1" | 2 |

### 17.3.1 **Lamp Holder Set – Exploded View**



## 17.3.2 **Lamp Holder Set – Parts List**

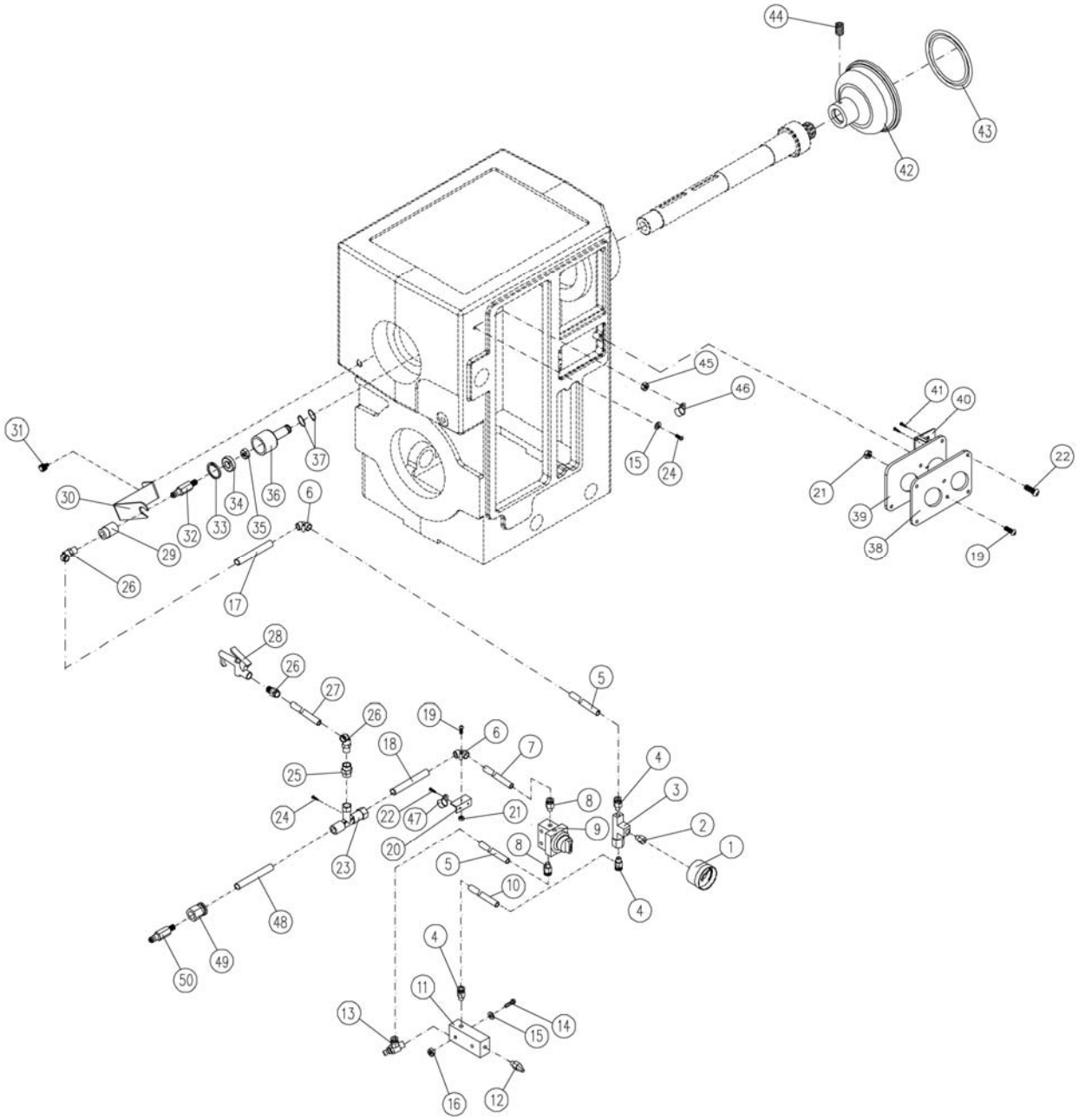
| Index No | Part No | Description | Size | Qty |
|---|---|---|---|---|
| | 6294901 | Lamp Holder Set *(includes #1 thru 25)* | | 1 |
| 1 | 4224B-301 | Support Tube | | 1 |
| 2 | 4224B-302 | Lamp Holder | | 1 |
| 3 | 4224B-303 | Junction Box | | 1 |
| 4 | 4224B-304 | Current Overload Switch | 15A | 1 |
| 5 | 4224B-305 | Gasket | | 1 |
| 6 | 4224B-306 | Receptacle Cover Plate | | 1 |
| 7 | 4224B-307 | Strain Relief | PG11 | 1 |
| 8 | 4224B-308 | Power Cord | AWG14 | 1 |
| 9 | 4224B-309 | Socket with Cover | | 4 |
| 10 | TS-1533062 | Phillips Pan Head Machine Screw | M5 x 20 | 5 |
| 11 | 4224B-311 | Jumper (Black) | | 4 |
| 12 | 4224B-312 | Jumper (White) | | 3 |
| 13 | TS-0733041 | Star Washer | M5 | 2 |
| 14 | TS-1540031 | Hex Nut | M5 | 2 |
| 15 | 4224B-315 | Ground Jumper (Green) | | 4 |
| 16 | TS-0270011 | Set Screw | 5/16”-18 x 1/4” | 1 |
| 17 | 6143004 | Retaining Collar | | 1 |
| 18 | TS-1550031 | Flat washer | M5 | 4 |
| 19 | TS-1541011 | Nylon Hex Nut | M5 | 2 |
| 20 | TS-1481081 | Hex Bolt | M5 x 35 | 2 |
| 21 | 4224B-321 | Cord Restraint | | 3 |
| 22 | JML-59A | Lock Handle | | 2 |
| 23 | 4224B-323 | Holder Shaft | | 1 |
| 24 | TS-0253031 | Socket Head Button Screw | #10-24 x 1/2” | 5 |
| 25 | TS-069204 | Flat Washer | #10 | 2 |

## 17.3.3 **Lamp Kit – Parts List**

| Index No. | Part No. | Description | Size | Qty. |
|---|---|---|---|---|
| | 6294901K | Lamp Kit *(includes #40-44)* | | 1 |
| 40 | 6294901 | Lamp Holder Set *(includes #1 thru 25)* | | 1 |
| 41 | 6294902 | Lamp (bulb not included) *(includes #42-44)* | 100W | 2 |
| 42 | * | Stud | M51 | 2 |
| 43 | * | Lock Washer, Internal tooth | 3/8” | 2 |
| 44 | * | Jam Nut | 3/8” | 2 |

NOTE: Powermatic lamps are supplied by Moffatt. For replacement parts indicated by an asterisk (*), contact Moffatt directly at 800-346-0761.

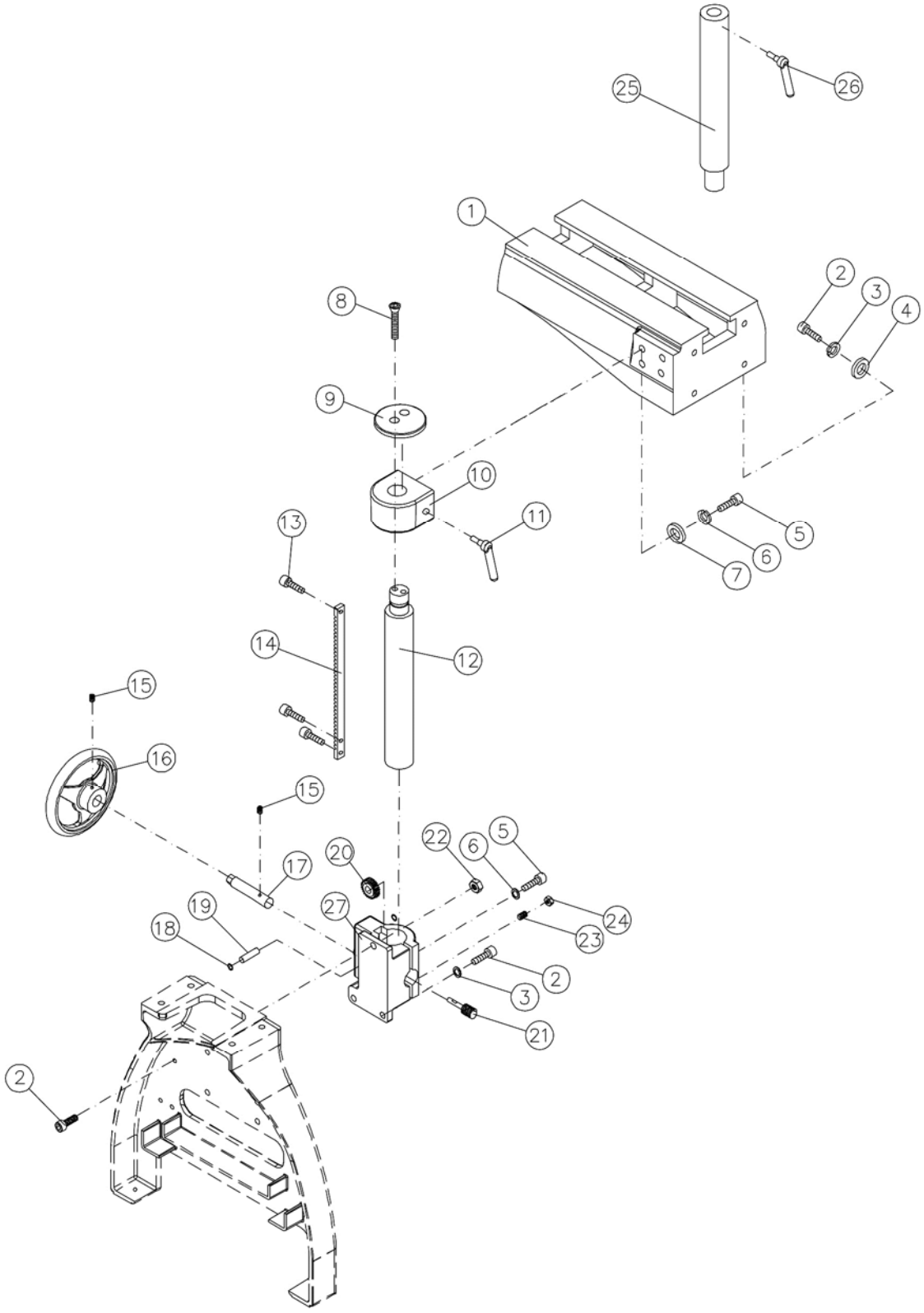
## 17.4.1 **Vacuum System – Exploded View**



## 17.4.2 **Vacuum System – Parts List**

| Index No | Part No | Description | Size | Qty |
|---|---|---|---|---|
| 1 | 4224B-401 | Pressure Vacuum Gauge | | 1 |
| 2 | 4224B-402 | Gauge Fitting | | 1 |
| 3 | 4224B-403 | Tee Fitting | | 1 |
| 4 | 4224B-404 | Quick Release Fitting | 1/4” NPT | 3 |
| 5 | 4224B-405 | Air Line | 350mm | 2 |
| 6 | 4224B-406 | Elbow Fitting | | 2 |
| 7 | 4224B-407 | Air Line | 390mm | 1 |
| 8 | 4224B-408 | Quick Release Fitting | 1/8” NPT | 2 |
| 9 | 4224B-409 | Vacuum Switch | | 1 |
| 10 | 4224B-410 | Air Line | 230mm | 1 |
| 11 | 4224B-411 | Vacuum Generator with Silencer | | 1 |
| 12 | 4224B-412 | Silencer | | 1 |
| 13 | 4224B-413 | Air Flow Regulator | | 1 |
| 14 | 4224B-414 | Socket Head Button Screw | M4-0.7Px45 | 2 |
| 15 | TS-1550021 | Flat Washer | M4 | 3 |
| 16 | TS-1541001 | Nylon Nut | M4 | 2 |
| 17 | 4224B-417 | Air Line | 800mm | 1 |
| 18 | 4224B-418 | Air Line | 110mm | 1 |
| 19 | 4224B-419 | Socket Head Button Screw | M3x20 | 3 |
| 20 | 4224B-420 | Bracket | | 1 |
| 21 | TS-1540011 | Hex Nut | M3 | 3 |
| 22 | TS-0253031 | Socket Head Button Screw | #10-24x1/2” | 6 |
| 23 | 4224B-423 | Tee Fitting | | 1 |
| 24 | 4224B-424 | Socket Head Button Screw | M4-0.7Px25 | 3 |
| 25 | 4224B-425 | Union | | 1 |
| 26 | 4224B-426 | Elbow Fitting | 1/4” NPT | 3 |
| | 4224B-BGS | Air Blow Gun Set *(includes #27 thru 28)* | | 1 |
| 27 | 4224B-427 | Air Line | 3M | 1 |
| 28 | 4224B-428 | Air Blow Gun | | 1 |
| 29 | 4224B-429 | Coupler | 1/4” NPT | 1 |
| 30 | 4224B-430 | Support Bracket | | 1 |
| 31 | 4224B-431 | Lock Knob | | 1 |
| | 4224B-VAA | Vacuum Adaptor Assembly *(includes #32 thru 37)* | | 1 |
| 32 | 4224B-432 | Male Adaptor | | 1 |
| 33 | 4224B-433 | C-Ring | R-32 | 1 |
| 34 | BB-6201VV | Ball Bearing | 6201VV | 1 |
| 35 | 4224B-435 | Nylon Nut | M12-1.75P | 1 |
| 36 | 4224B-436 | Vacuum Adaptor Body | | 1 |
| 37 | 4224B-437 | O-Ring | O12 | 2 |
| 38 | 4224B-438 | Vacuum Face Plate | | 1 |
| 39 | 4224B-439 | Face Plate | | 1 |
| 40 | 4224B-440 | Bracket | | 1 |
| 41 | 4224B-441 | Pan Head Screw | M3x6 | 2 |
| | 4224B-VCA | Vacuum Chuck Assembly *(includes #42 thru 44)* | | 1 |
| 42 | 4224B-442 | Vacuum Chuck | | 1 |
| 43 | 4224B-443 | Seal | | 1 |
| 44 | 6295796 | Nylon Insert Socket Set Screw | 1/4-20x3/8” | 2 |
| 45 | TS-1540021 | Hex Nut | M4 | 1 |
| 46 | JWL1642-183 | Air Line Clamp | | 1 |
| 47 | 4224B-447 | Air Line Clamp | | 1 |
| 48 | 4224B-448 | Air Line | 600mm | 1 |
| | 4224B-CFPS | Coupler Fitting Plug Set *(includes #49 thru 50)* | | 1 |
| 49 | 4224B-449 | Female Straight Fitting | | 1 |
| 50 | 4224B-450 | Coupler Fitting Plug, Male | | 1 |

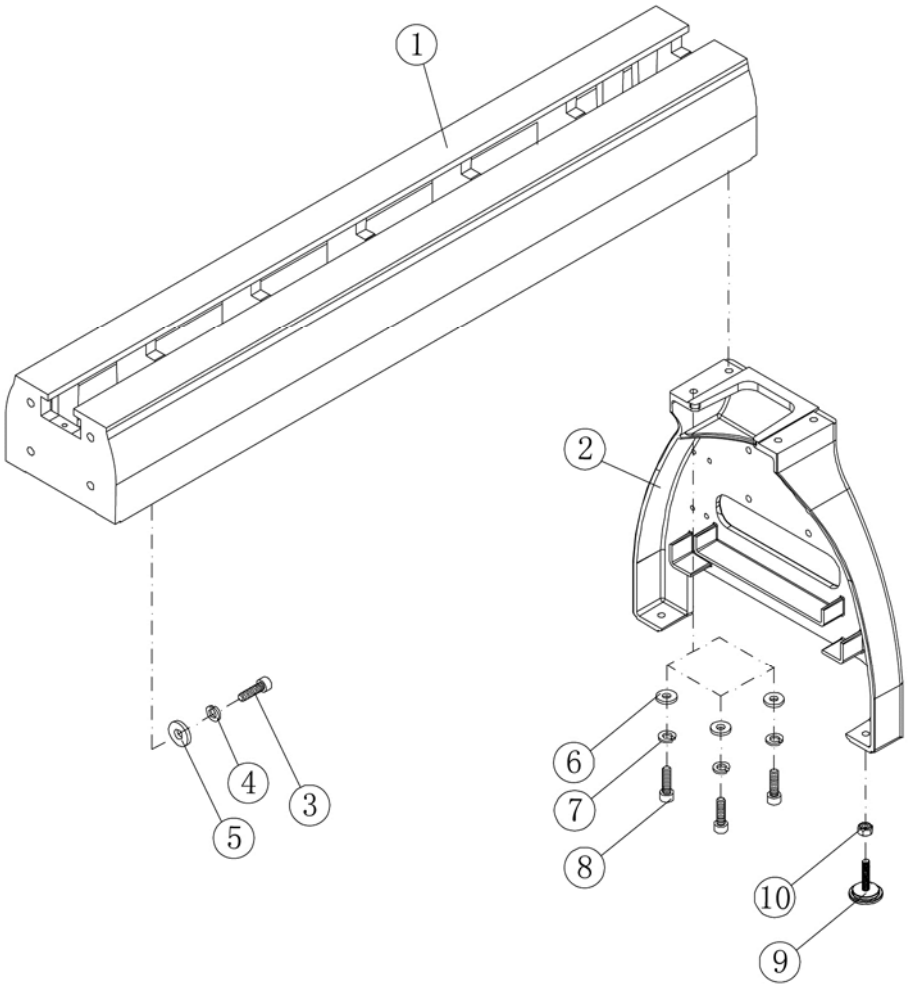
### 17.5.1 **20-inch Extension Bed Kit *(Optional Accessory)* – Exploded View**



## 17.5.2 **20-inch Extension Bed Kit *(Optional Accessory)* – Parts List**

| Index No | Part No | Description | Size | Qty |
|---|---|---|---|---|
| | 6294900 | 20” Extension Bed Kit (*includes #1 thru 27)* | | 1 |
| 1 | 6294905 | 20” Extension Bed (*includes #2 thru 4, 25, 26)* | | 1 |
| 2 | 4224B-502 | Socket Head Cap Screw | 1/2”-12x2” | 7 |
| 3 | TS-0720111 | Lock Washer | 1/2” | 6 |
| 4 | TS-0680061 | Flat Washer | 1/2” | 4 |
| 5 | TS-0209081 | Socket Head Cap Screw | 3/8”-16x1-3/4” | 6 |
| 6 | TS-0720091 | Lock Washer | 3/8” | 6 |
| 7 | TS-0680042 | Flat Washer | 3/8” | 4 |
| 8 | 4224B-508 | Socket Flat Head Screw | 3/8”-16x1” | 2 |
| 9 | 4224B-509 | Top Plate | | 1 |
| 10 | 4224B-510 | Pivot Bracket | | 1 |
| 11 | 4224B-209 | Lock Handle | | 1 |
| 12 | 4224B-512 | Column | | 1 |
| 13 | TS-0209031 | Socket Head Cap Screw | 3/8”-16x3/4” | 3 |
| 14 | 4224B-514 | Rack | | 1 |
| 15 | TS-0270031 | Set Screw | 5/16”-18x3/8” | 4 |
| 16 | 4224B-226 | Handwheel | | 1 |
| 17 | 4224B-517 | Extension Shaft | | 1 |
| 18 | 4224B-518 | C-Ring | S-12 | 2 |
| 19 | 4224B-519 | Shaft | | 1 |
| 20 | 4224B-520 | Gear | | 1 |
| 21 | 4224B-521 | Worm | | 1 |
| 22 | 4224B-522 | Nylon Nut | 1/2”-12 | 1 |
| 23 | TS-0271111 | Set Screw | 3/8”-16x1-1/2” | 1 |
| 24 | TS-0570031 | Hex Nut | 3/8”-16 | 1 |
| 25 | 6295853 | Tool Rest Post | | 1 |
| 26 | 6294763 | Lock Handle | | 2 |
| 27 | 4224B-527 | Gear Base | | 1 |

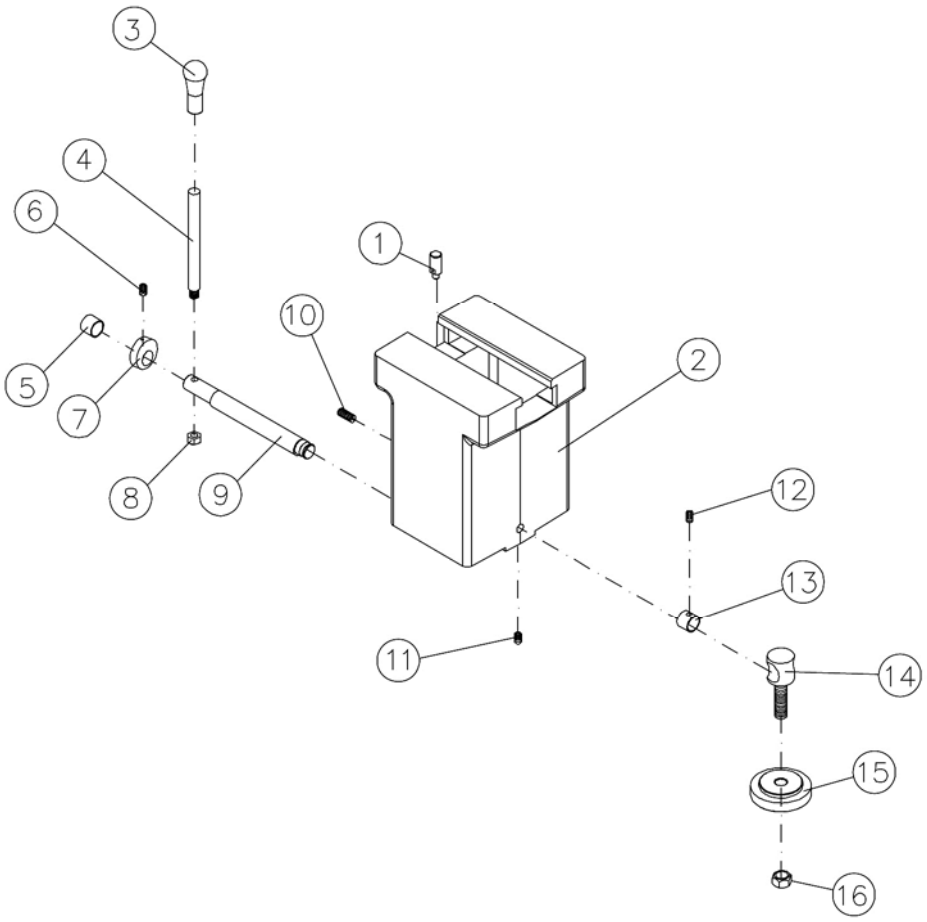
## 17.6.1 **63-inch Extension Bed Assembly *(Optional Accessory)* – Exploded View**




## 17.6.2 **63-inch Extension Bed Assembly *(Optional Accessory)* – Parts List**

| Index No | Part No | Description | Size | Qty |
|---|---|---|---|---|
| ..... | 6294904 | 63” Extension Bed with Leg *(includes #1 thru 10 .... )* | | 1 |
| 1 | 4224B-201 | Bed | | 1 |
| 2 | 4224B-202 | Leg | | 1 |
| 3 | 4224B-502 | Socket Head Cap Screw | 1/2”-12x2” | 4 |
| 4 | TS-0720111 | Lock Washer | 1/2” | 4 |
| 5 | TS-0680061 | Flat Washer | 1/2” | 4 |
| 6 | TS-0680042 | Flat Washer | 3/8” | 4 |
| 7 | TS-0720091 | Lock Washer | 3/8” | 4 |
| 8 | TS-0209071 | Socket Head Cap Screw | 3/8”-16x1-1/2” | 4 |
| 9 | 4224B-262 | Leveling Foot | | 2 |
| 10 | 4224B-263 | Hex Nut | 1/2”-12 | 2 |

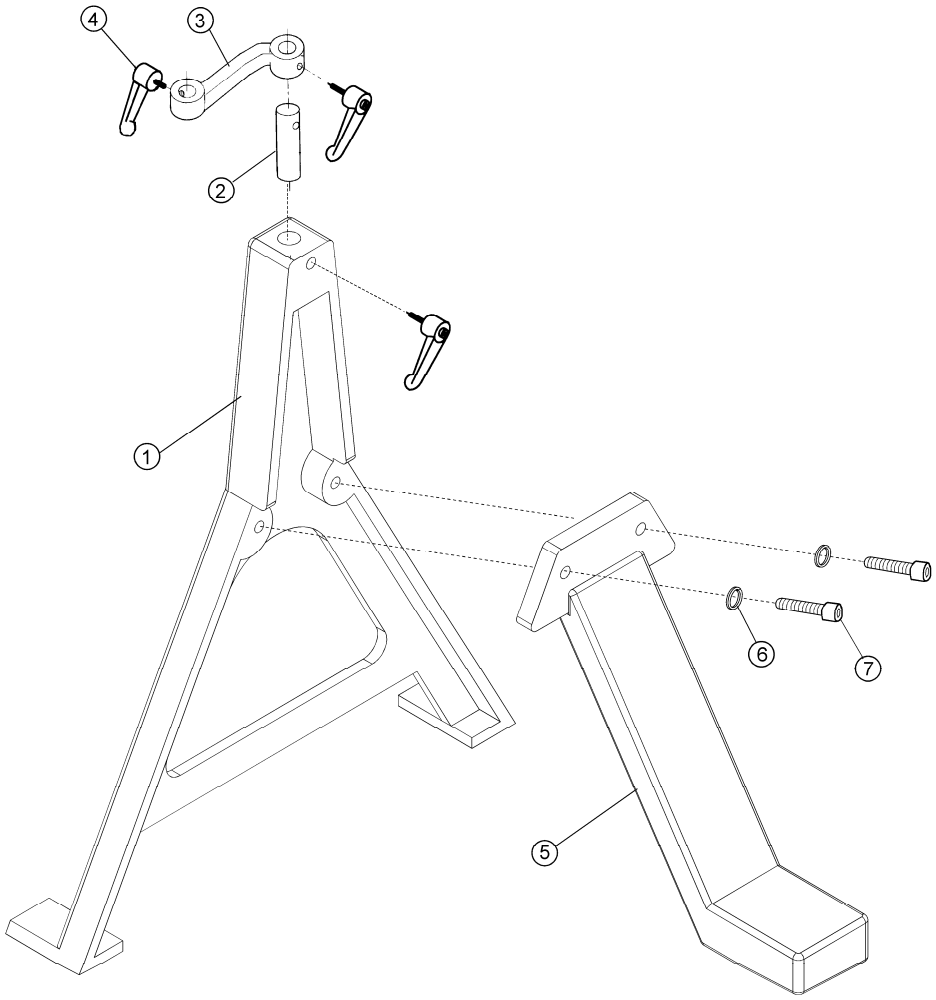
## 17.7.1 **Tailstock Riser Block Assembly *(Optional Accessory)* – Exploded View**



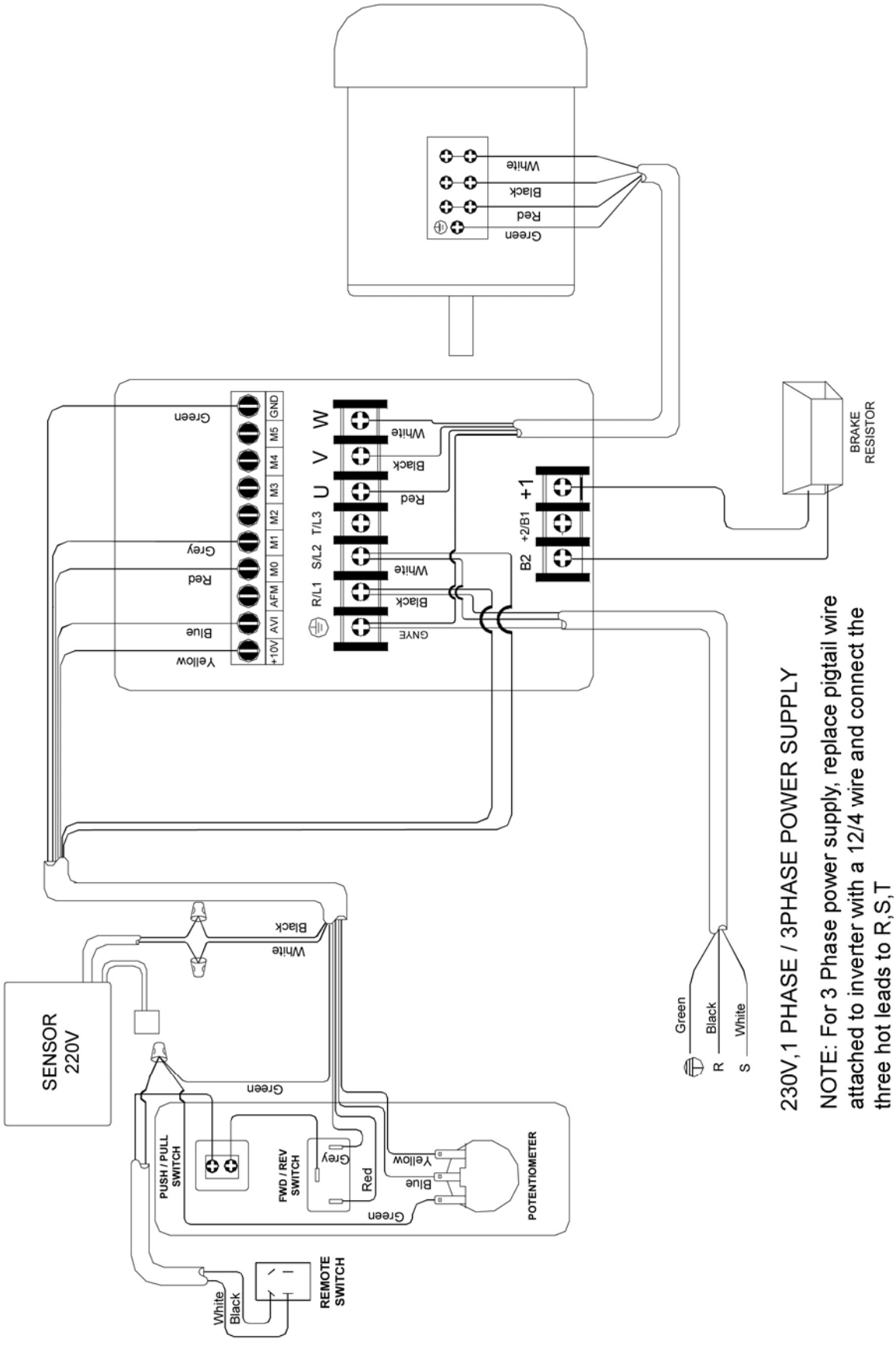

## 17.7.2 **Tailstock Riser Block Assembly *(Optional Accessory)* – Parts List**

| Index No | Part No | Description | Size | Qty |
|---|---|---|---|---|
| | 6294903 | Tailstock Riser Block Assembly *(includes #1 thru 16)* | | |
| 1 | 6295754 | Stop Bolt | | 1 |
| 2 | 4224B-602 | Riser Block Casting | | 1 |
| 3 | 4224B-165 | Lock Handle | | 1 |
| 4 | 4224B-229 | Rod | | 1 |
| 5 | 6095038 | Bushing | | 1 |
| 6 | TS-0267021 | Set Screw | 1/4”-20x1/4” | 1 |
| 7 | 4224B-228 | Eccentric Collar | | 1 |
| 8 | TS-0640091 | Nylon Nut | 3/8”-16 | 1 |
| 9 | 4224B-232 | Eccentric Cam | | 1 |
| 10 | 4224B-267 | Ball Plunger | | 1 |
| 11 | 4224B-138 | Set Screw | #10-24x1” | 1 |
| 12 | TS-0270011 | Set Screw | 5/16”-18x1/4” | 1 |
| 13 | 3096003 | Collar | | 1 |
| 14 | 3058001 | Bolt | | 1 |
| 15 | 4224B-136 | Cam Locking Disc | | 1 |
| 16 | 6520009 | Nylon Nut | 5/8”-11 | 1 |

## 17.8.0 **Outboard Turning Stand *(Optional Accessory)* – Exploded View**




## 17.8.1 **Outboard Turning Stand *(Optional Accessory)* – Parts List**

| Index No. | Part No. | Description | Size | Qty. |
|---|---|---|---|---|
| | 6294732 | Heavy Duty Outboard Turning Stand Assembly *(includes # 1 thru 7)* | | |
| 1 | 3042503 | Turning Stand Base | | 1 |
| 2 | 6295897 | Offset Tool Support Pin | 1.00” diameter | 1 |
| 3 | 6295898 | Offset Tool Support Casting | 1.00” hole | 1 |
| 4 | 2695026 | Screw Lock Assembly | | 3 |
| 5 | 3423055 | Turning Stand Leg | | 1 |
| 6 | 6861700 | Lock Washer | 5/8” | 2 |
| 7 | 6769002 | Socket Head Cap Screw | 5/8”-18 x 2” | 2 |

# 18.0 **Electrical Connections – 4224B Lathe**